NUEXCO

Monthly Report

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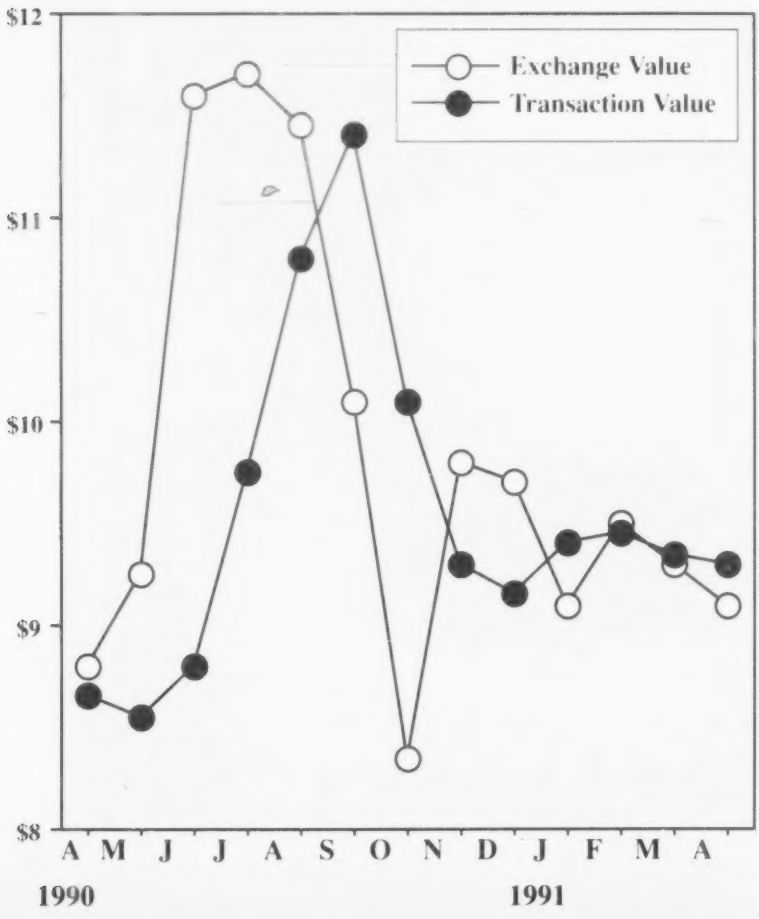

NUEXCO

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- **Soviet Union's Energy Situation**

The Soviet Union is a country of vast sources of energy including oil, natural gas, coal, uranium, and hydropower. In spite of this wealth of resources, the Soviet Union has difficulty meeting its demand for energy. This article analyzes the energy situation in the Soviet Union and gives its outlook for the future.

Raw Materials 23
- **Jabiluka Uranium Project**

The Jabiluka gold and uranium deposit in the Northern Territory of Australia is the world's largest known primary uranium deposit. Once developed, Jabiluka's planned capacity would be 3.3 million pounds U_3O_8 per year. If the Australian government continues its recent moves toward progressive and flexible uranium policies, Jabiluka could take its place among the first rank of world uranium producers.

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To Our Readers

NUEXCO would like to draw your attention to two changes in the Monthly Report:

First, please note that the telephone and fax numbers of our Hong Kong office have changed. The new numbers are given here and are regularly listed on the inside front cover of each Report.

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Secondly, please note that we have changed slightly the way we calculate the Market Values Expressed in Selected Currencies. We now calculate the values using the currency exchange rates *for* the last business day of the month as published in the Wall Street Journal. Previously, the values were calculated using the currency exchange rates *published on* the last business day of the month.

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Market Values Summary

NUEXCO Market Values	This Report April 30, 1991	Last Report March 31, 1991	12 Months Ago April 30, 1990
EXCHANGE VALUE[1]	**$9.10**/lb equivalent U_3O_8	$9.30	$8.80
UF_6 VALUE[2]	**$27.25**/kg U as UF_6	$27.50	$24.40
LOAN RATE[3]	**3.5%**/annum	3.5%	3.5%
CONVERSION VALUE[4]	**$1.45**/lb U as UF_6	$1.45	$1.45
SWU VALUE[5] **(0.3% tails assay)**	**$52**/SWU	$52	$50
TRANSACTION VALUE[6]	**$9.30**/lb equivalent U_3O_8	$9.35	$8.65
Transactions	**22**	19	24
Months	**3**	3	3
Millions of Pounds	**5.6**	3.0	8.4

DEFINITIONS

1 The **Exchange Value** is NUEXCO's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.

2 The **UF_6 Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.

3 The **Loan Rate** is NUEXCO's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.

4 The **Conversion Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.

5 The **SWU Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.

6 The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:

a) Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;

b) At least ten transactions;

c) Transactions involving a sum total of at least 2 million pounds equivalent U_3O_8.

DERIVATIONS AND COMMENTS

- All **Market Values** are expressed in terms of US$.
- All **Market Values** are based on:
  - Data from recently completed transactions.
  - Data from pending transactions.
  - Firm bids to buy or borrow, and firm offers to sell or lend.
  - Prices purchasers or rates borrowers have expressed a willingness to pay, but for which NUEXCO is not aware of firm bids to buy or borrow and prices sellers or rates lenders have expressed a willingness to accept, but for which NUEXCO is not aware of firm offers to sell or lend.
- Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these **Market Values**.
- In the determination of prices, NUEXCO does not consider charges for transportation other than that customarily provided by suppliers.
- The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
- For the **SWU Value**, NUEXCO converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight percent U^{235} and a product assay of 3.0 weight-percent U^{235}, assuming feed costs corresponding to the NUEXCO **Exchange Value** and **Conversion Value** determined as of the same date.
- In calculating the **Transaction Value**, NUEXCO does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future **Exchange Values** or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it can not currently be determined.
- The sample time for the **Transaction Value** is extended as necessary to satisfy the minima for the number of transactions and quantity of material. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

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MARKET REVIEW

APRIL MARKET REVIEW

(as of April 30, 1991)

OVERVIEW

The uranium market softened somewhat during April, reaching a bottom near mid-month and strengthening slightly by month end. The Exchange Value fell $0.20, to $9.10 per pound U_3O_8, and the UF_6 Value also fell, declining to $27.25 per kgU as UF_6. Nine near-term uranium sales were reported, totalling almost 4 million pounds equivalent U_3O_8 in five concentrates, three UF_6, and one enriched uranium product (EUP) sales (**Table 1**).

Uranium sales volume increased significantly during April, particularly during the third week of the month. The 3.8 million pounds equivalent U_3O_8 that were sold during April is the highest monthly sales volume thus far in 1991, outdistancing January, February, and March's volume of 1.0, 1.8, and 2.2 million pounds, respectively. This increase in volume is normal for the second quarter, traditionally the busiest quarter of the year. Although 1991 year-to-date sales volume has reached 8.8 million pounds equivalent U_3O_8, it is lagging well behind last year's record volume of 13.9 million pounds for the same time period. The lack of discretionary buyers, particularly producers, in the market may be the chief reason for the lower volume thus far.

The Loan Rate remained unchanged at 3.5 percent per annum. Only one loan for a small quantity of concentrates is reported. The Conversion Value was also unchanged at $1.45 per pound U as UF_6. Two conversion sales for moderate quantities are reported.

The SWU Value remained at $52 per SWU. Four near- and intermediate-term sales were concluded, totalling over 250 thousand SWU.

Table 1
NEAR-TERM URANIUM SALES SUMMARY

	April 1991		Year-to-Date	
	No. of Sales	Volume[1]	No. of Sales	Volume[1]
Concentrates	5	1.2	19	3.4
Natural UF_6	3	2.4	9	3.3
EUP	1	0.2	8	2.1
Total[2]	**9**	**3.8**	**36**	**8.8**

[1] million pounds equivalent U_3O_8
[2] columns may not total due to independent rounding

NATURAL URANIUM AND CONVERSION

The **Exchange Value** declined by $0.20 (2%) on April 30, to **$9.10** per pound U_3O_8. The market continued its downward trend early in April, reaching a bottom near mid-month. Most of the month's activity also occurred at that point, leading to an increase in offer prices. Unlike past months when most demand was discretionary, demand in April primarily was a result of buyers seeking to fill specific needs. Nearly all of the active demand came from North American buyers, with demand in Europe very low. As the market firmed near the end of the month, prices did not begin to strengthen as they did last year. Market participants see little significant upward pressure on prices, and many buyers and sellers believe prices will not change significantly in the upcoming months.

Of the nine near-term uranium sales, five involved concentrates totalling over 1.2 million pounds equivalent U_3O_8. US intermediaries sold most of the material to other US entities at prices near the April 30, 1991 Exchange Value.

* * *

The UF_6 market also weakened during April. By month-end, the **UF_6 Value** slipped $0.25 (1%), to **$27.25** per kgU as UF_6. Due mostly to one large inventory purchase, utilities purchased over 2.3 million pounds equivalent U_3O_8 in three near-term natural UF_6 transactions. All three sales took place at prices at or near the April 30 UF_6 Value.

Table 2
NEAR-TERM SUPPLY/DEMAND SUMMARY

	Active Supply[1]	Active Demand[1]
• Uranium (thousand lbs equivalent U_3O_8)	6,085	1,455
• Supply/Demand Ratio:	4.2	
• Loan (thousand lbs equivalent U_3O_8)	6,900	,940
• Conversion (thousand lbs U as UF_6)	700	350
• SWU (thousand SWUs)	425	105

[1] Supply and Demand tables in the Market Review section of this Report provide details for each category.

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In the long-term market, utilities purchased nearly four million pounds equivalent U_3O_8 in five transactions. The contracts call for delivery during the period 1991 to 1998, and utilize fixed price and market-related pricing mechanisms. Five utilities continued to evaluate long-term uranium offers at month end.

* * *

The **Transaction Value** dropped $0.05, to **$9.30** per pound U_3O_8 based on 22 transactions over 3 months involving 5.6 million pounds equivalent U_3O_8, with April's lower-priced sales responsible for the decline.

* * *

Historically, demand increases during the second quarter of a year. This year was no exception; firm demand increased during the month, but emerging supply more than filled the new demand. So at the end of the month, **active uranium demand** equalled only **1.5** million pounds equivalent U_3O_8, whereas **active uranium supply** grew slightly, increasing to **6.1** million pounds equivalent U_3O_8 (**Table 2**). The **supply-demand ratio** became **4.2**.

* * *

The **Loan Rate** was unchanged at **3.5** percent per annum. Only one loan was reported, in which a US utility lent a small quantity of concentrates to an intermediary near the prevailing Loan Rate.

* * *

The **Conversion Value** was also unchanged, remaining at **$1.45** per pound U as UF_6. Two conversion sales were reported from April totalling nearly 400 thousand pounds U. Intermediaries sold the material to a utility and another intermediary at prices near the April 30 Conversion Value for delivery later this year. Available supply of low-priced conversion appears to be thinning, but the current lack of demand for spot conversion prevents any substantial recovery in this market.

* * *

ENRICHMENT SERVICES AND ENRICHED URANIUM PRODUCT

The **SWU Value** remained at **$52** per SWU. Four near- and intermediate-term enrichment sales were reported for a total exceeding 250 thousand SWU. Utilities made all four purchases at levels near the April 30 SWU Value. One of the sales involved a small quantity of SWU contained in EUP. The SWU market remained active during April, and at least nine utilities were still evaluating near- and long-term SWU offers at the end of the month.

Table 3
ENRICHMENT PRICES
(April 30, 1991)

Prices	This Month Report 273	Last Month Report 272	12 Months Ago Report 261
NUEXCO SWU Value ($US per SWU)	52	52	50
US DOE SWU prices: ($US per SWU)			
USEC	117.85[1]	117.85[1]	117.85[1]
AFC	153.00[3]	153.00[3]	153.00[3]
Requirements	157.00[3]	157.00[3]	157.00[3]
Incentive Price (IP2)[4]	100.60[4]	100.60[4]	90.00[5]
Calculated worth of enriched UF_6[6]: ($US per KgU as UF_6)			
2.0 w/o U_{235}	200	202	193
2.5 w/o U_{235}	276	279	267
3.0 w/o U_{235}	355	359	343
3.5 w/o U_{235}	436	440	421
4.0 w/o U_{235}	517	522	500
4.5 w/o U_{235}	600	605	579

[1] Effective 10/1/89 to 9/30/91.
[2] Effective 10/1/87 to 9/30/89.
[3] Effective since 10/1/84.
[4] IP2: Effective 10/1/90 to 9/30/91, for up to 30% of annual requirements.
[5] Used Incentive Price IP1 – effective 10/1/86 to 9/30/90, for up to 30% of annual requirements.
[6] Calculated using the NUEXCO Exchange Value, Conversion Value, SWU Value and 0.30 w/o tails assay.

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MARKET REVIEW

RECENT TRANSACTIONS

Uranium Sales[1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U_3O_8)	Price Within Percentage Range[2] of Current Exchange or UF_6 Value	Buyer	Seller	Remarks
5086	1991	301-600	103-110	Intermediary	Intermediary	
5087	1995-1996	301-600	R	Utility	Intermediary	
5089	1992-1996	601-1,000	See Remarks	Utility	R	Price Related to Market
5090	1995-1998	601-1,000	See Remarks	Utility	R	Series of Fixed Prices
5091	1991-1992	1,001-3,000	98-102	Utility	Intermediary	UF_6
5092	1991	101-300	98-102	Utility	Intermediary	
5096	1991	101-300	98-102	Convertor	Intermediary	
5097	1991	101-300	98-102	Producer	Intermediary	
5099	1991	301-600	98-102	Utility	R	UF_6
5100A	1992	101-300	See Remarks	Utility	Intermediary	Contained in EUP
5104	1991-1997	1,001-3,000	See Remarks	Utility	Producer	Price Related to to Market
5105	1992-1994	601-1,000	See Remarks	Utility	Producer	Price Related to to Market
5106	1991	50-100	98-102	Utility	R	
5107	1991	50-100	98-102	Utility	Intermediary	UF_6

R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality.

[1] Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information.

[2] The ranges *Below 90, 90-97, 98-102, 103-110, Above 110*, represent percentages (rounded to whole numbers) of the appropriate current Exchange Value or UF_6 Value. The endpoints of each range are included within that range.

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RECENT TRANSACTIONS

Natural Uranium Loans [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U_3O_8)	Price Within Percentage Range [2] of Current Loan Rate	Borrower	Lender	Remarks
5103	1991	50-100	98-102	Intermediary	Utility	

Conversion Sales [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds of U equivalent)	Price Within Percentage Range [2] of Current Conversion Value	Buyer	Seller	Remarks
5101	1991	101-300	90-97	Intermediary	Intermediary	
5102	1991	101-300	90-97	Utility	Intermediary	

Enrichment Sales [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity [3] (thousand SWU)	Price Within Percentage Range [2] of Current SWU Value [4]	Buyer	Seller	Remarks
5084	1991	50-100	98-102	Utility	Intermediary	
5085	1991	Less Than 50	98-102	Utility	Intermediary	
5098	1992-1995	101-300	See Remarks	Utility	Intermediary	Base Price Escalated
5100B	1992	Less Than 50	See Remarks	Utility	Intermediary	Contained in EUP

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[2] The ranges *Below 90, 90-97, 98-102, 103-110, Above 110*, represent percentages (rounded to whole numbers) of the appropriate current Market Value. The endpoints of each range are included within that range.

[3] If tails assay is unknown or unspecified, NUEXCO's calculation of SWU quantity assumes 0.30 w/o tails assay.

[4] Prices are usually normalized to 0.30 w/o tails assay. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.

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SUPPLY AND DEMAND

Uranium Supply

NUEXCO Project Number	Quantity (Thousand Pounds equivalent U_3O_8) Spot or Near-term[1]	Intermediate or Long-term[2]	Delivery Period	Remarks
AVAILABLE FOR SALE:				
ACTIVE				
90-1078A	700	1,045 per year	1991-1993	UF_6e
90-1227	500	—	1991	
90-1231	500	500 per year	1991-1995	
90-1501	3,000	1,000 per year	1991-1995	U_3O_8/UF_6
91-1060	100	—	1991	
91-1502	500	—	1991	
91-1504*	785	—	1991	UF_6
Total	**6,085**			
INACTIVE	**5,430**			
AVAILABLE FOR LOAN:				
ACTIVE				
90-1016	1,000	—		U_3O_8
90-1230	1,000	—		U_3O_8
91-1034	1,000	—		U_3O_8
91-1084	3,900	—		U_3O_8
Total	**6,900**			
INACTIVE	**1,500**			

*New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: 91-1018
Active Projects removed since last month: 90-1260, 90-1275

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SUPPLY AND DEMAND

Uranium Demand

NUEXCO Project Number	Quantity (Thousand Pounds equivalent U_3O_8) Spot or Near-term[1]	Intermediate or Long-term[2]	Delivery Period	Remarks
INQUIRIES TO PURCHASE:				
ACTIVE				
90-1100A	45	—	1991	UF_6e
90-1224A*	300	11,700	1991-2001	$U_3O_8/UF_6/UF_6e$
91-1010A	85	—	1991	UF_6e
91-1101*	25	—	1991	
91-1102*	1,000	1,000 per year	1991-1995	U_3O_8/UF_6
90-1291	—	100 per year	1991-1995	
91-1014A	—	6,800	1992-2001	UF_6e
91-1017	—	300 per year	1995-2000	
91-1054	—	1,200	1992-1997	
91-1064*	—	230 per year	1993-1997	U_3O_8/UF_6
91-1093*	—	200 per year	1994-1996	
91-1094A*	—	1,700 per year	1994-1995	UF_6e
Total	**1,455**			
INACTIVE	**3,690**			
INQUIRIES TO BORROW:				
ACTIVE				
91-1100*	940	—		UF_6
Total	**940**			
INACTIVE	*None reported*			

* New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: 91-1045, 91-1075, 91-1080A
Active Projects removed since last month: 90-1289, 91-1038, 91-1040, 91-1067, 91-1071A, 91-1073, 91-1074,

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MARKET REVIEW

SUPPLY AND DEMAND

Conversion Supply And Demand

NUEXCO Project Number	Quantity (Thousand Pounds U as UF_6) Within 3 Years [1]	Beyond 3 Years [1]	Delivery Period	Remarks
AVAILABLE FOR SALE:				
ACTIVE				
91-1500	300	—	1991	
91-1501	400	—	1991	
Total	**700**			
INACTIVE	*None reported*			
INQUIRIES TO PURCHASE:				
ACTIVE				
91-1085*	350	3,000	1993-1998	
Total	**350**			
INACTIVE	*None reported*			

* New or revised since last month.

[1] Measured from the date of this Report.

Active Projects reclassified as Inactive since last month: *none*
Active Projects removed since last month: 91-1077

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SUPPLY AND DEMAND

SWU Supply And Demand

NUEXCO Project Number	Quantity (Thousand SWUs) Spot or Near-term [1]	Quantity (Thousand SWUs) Intermediate or Long-term [2]	Delivery Period	Remarks
AVAILABLE FOR SALE:				
ACTIVE				
90-1078B	200	435 per year	1991-1993	UF6e
91-1008	75	—	1991	
91-1032	150	—	1991	
90-1500	—	1,000	1991 on	
Total	**425**			
INACTIVE	**815**			
INQUIRIES TO PURCHASE:				
ACTIVE				
90-1100B	15	—	1991	UF6e
90-1224B*	40	1,920	1991-2001	UF6e
91-1010B	20	—	1991	UF6e
91-1069	30	—	1991	
90-1181	—	1,500	1996-2001	
90-1196	—	60 per year	1995 on	
90-1301	—	1,000 per year	1995-2000	UF6e
91-1014B	—	1,770	1992-2001	UF6e
91-1027	—	55 per year	1996-2000	
91-1028	—	125	1995-1996	
91-1055	—	180	1992	UF6e
91-1063	—	15 per year	1995-1998	
91-1066	—	320	1995-2000	
91-1083	—	150 per year	1996-1998	
91-1094B*	—	385 per year	1994-1995	UF6e
Total	**105**			
INACTIVE	**170**			

* New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes SWU deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month. 88-1006, 91-1080B

Active Projects removed since last month: 90-1094, 91-1023, 91-1071B

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MARKET REVIEW

MARKET VALUES EXPRESSED IN SELECTED CURRENCIES

Exchange Value[1]

Country (currency)	per lb equivalent U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)
Australia (dollar)	11.64	12.00	11.69	30.25	31.20	30.40
Belgium (franc)	319.07	326.43	304.50	829.52	848.65	791.63
Canada (dollar)	10.49	10.77	10.24	27.28	28.01	26.62
EC (ecu)	7.65	7.75	7.24	19.89	20.15	18.82
Finland (markka)	36.30	37.48	34.82	94.36	97.45	90.53
France (franc)	52.52	53.68	49.49	136.54	139.56	128.67
Germany (mark)	15.55	15.86	14.77	40.42	41.24	38.39
Italy (lira)	11,480	11,805	10,815	29,845	30,690	28,116
Japan (yen)	1,239	1,314	1,402	3,222	3,415	3,645
Netherlands (guilder)	17.49	17.88	16.59	45.46	46.48	43.13
So. Africa (comm. rand)	25.36	25.40	23.39	65.92	66.04	60.80
So. Korea (won)	6,604	6,749	6,178	17,170	17,547	16,060
Spain (peseta)	957.29	983.09	933.29	2,489	2,556	2,426
Sweden (krona)	55.73	57.27	53.56	144.87	148.88	139.25
Switzerland (franc)	13.13	13.52	12.80	34.13	35.15	33.29
Taiwan (dollar)	244.79	250.36	231.44	636.39	650.87	601.69
UK (pound)	5.26	5.34	5.38	13.67	13.89	13.99
US (dollar)	9.10	9.30	8.80	23.66	24.18	22.88

Transaction Value[1]

Country (currency)	per lb equivalent U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)
Australia (dollar)	11.89	12.06	11.50	30.92	31.37	29.88
Belgium (franc)	326.09	328.19	299.31	847.75	853.21	778.13
Canada (dollar)	10.72	10.83	10.06	27.88	28.16	26.16
EC (ecu)	7.82	7.79	7.11	20.32	20.25	18.50
Finland (markka)	37.09	37.68	34.23	96.43	97.97	88.98
France (franc)	53.67	53.97	48.65	139.54	140.31	126.47
Germany (mark)	15.89	15.95	14.52	41.31	41.46	37.74
Italy (lira)	11,732	11,868	10,630	30,501	30,855	27,637
Japan (yen)	1,267	1,321	1,378	3,293	3,433	3,583
Netherlands (guilder)	17.87	17.97	16.31	46.46	46.73	42.39
So. Africa (comm. rand)	25.91	25.54	22.99	67.37	66.40	59.76
So. Korea (won)	6,749	6,786	6,072	17,547	17,641	15,787
Spain (peseta)	978.33	988.37	917.38	2,543	2,570	2,385
Sweden (krona)	56.95	57.57	52.65	148.06	149.68	136.87
Switzerland (franc)	13.42	13.59	12.59	34.88	35.34	32.72
Taiwan (dollar)	250.17	251.70	227.49	650.38	654.37	591.43
UK (pound)	5.37	5.37	5.29	13.97	13.97	13.75
US (dollar)	9.30	9.35	8.65	24.18	24.31	22.49

[1]Calculated using currency exchange rates published in *The Wall Street Journal* for the last business day of the month..

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MARKET VALUES EXPRESSED IN SELECTED CURRENCIES

Conversion Value[1]

Country (currency)	per lb U as UF_6			per kg U as UF_6		
	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)
Australia (dollar)	1.85	1.87	1.93	4.09	4.12	4.25
Belgium (franc)	50.84	50.90	50.17	112.09	112.20	110.61
Canada (dollar)	1.67	1.68	1.69	3.69	3.70	3.72
EC (ecu)	1.22	1.21	1.19	2.69	2.66	2.63
Finland (markka)	5.78	5.84	5.74	12.75	12.88	12.65
France (franc)	8.37	8.37	8.15	18.45	18.45	17.98
Germany (mark)	2.48	2.47	2.43	5.46	5.45	5.36
Italy (lira)	1,829	1,841	1,782	4,033	4,058	3,929
Japan (yen)	197.49	204.80	231.00	435.40	451.51	509.27
Netherlands (guilder)	2.79	2.79	2.73	6.14	6.15	6.03
So. Africa (comm. rand)	4.04	3.96	3.85	8.91	8.73	8.50
So. Korea (won)	1,052	1,052	1,018	2,320	2,320	2,244
Spain (peseta)	152.54	153.28	153.78	336.28	337.92	339.03
Sweden (krona)	8.88	8.93	8.83	19.58	19.68	19.46
Switzerland (franc)	2.09	2.11	2.11	4.61	4.65	4.65
Taiwan (dollar)	39.00	39.03	38.13	85.99	86.06	84.07
UK (pound)	0.84	0.83	0.89	1.85	1.84	1.95
US (dollar)	1.45	1.45	1.45	3.20	3.20	3.20

SWU Value And UF_6 Value[1]

Country (currency)	SWU Value at 0.30 w/o Tails Assay			UF_6 Value per kg U as UF_6		
	This Month (Apr. 30, 1991)	Last Month (Mar. 31, 1991)	12 Months Ago (Apr. 30, 1990)	This Month (Apr. 30, 199.	Last Month (Mar. 31 1991)	12 Months Ago (Apr. 30, 1990)
Australia (dollar)	66.50	67.10	66.45	34.85	35.48	32.43
Belgium (franc)	1,823	1,825	1,730	955.47	965.25	844.29
Canada (dollar)	59.96	60.24	58.17	31.42	31.86	28.39
EC (ecu)	43.71	43.33	41.13	22.91	22.91	20.07
Finland (markka)	207.40	209.58	197.85	108.69	110.84	96.55
France (franc)	300.11	300.16	281.20	157.27	158.74	137.23
Germany (mark)	88.84	88.69	83.91	46.56	46.90	40.95
Italy (lira)	65,599	66,007	61,448	34,376	34,907	29,986
Japan (yen)	7,083	7,345	7,966	3,712	3,884	3,887
Netherlands (guilder)	99.92	99.96	94.25	52.36	52.86	45.99
So. Africa (comm. rand)	144.89	142.04	132.87	75.93	75.12	64.84
So. Korea (won)	37,739	37,739	35,100	19,776	19,958	17,129
Spain (peseta)	5,470	5,497	5,303	2,867	2,907	2,588
Sweden (krona)	318.43	320.20	304.32	166.87	169.33	148.51
Switzerland (franc)	75.01	75.60	72.75	39.31	39.98	35.50
Taiwan (dollar)	1,399	1,400	1,315	733.02	740.30	641.72
UK (pound)	30.04	29.88	30.57	15.74	15.80	14.92
US (dollar)	52.00	52.00	50.00	27.25	27.50	24.40

[1]Calculated using currency exchange rates published in *The Wall Street Journal* for the last business day of the month.

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RECENT DEVELOPMENTS

Canada

On April 18, the Canadian Federal Environment Minister, Robert de Cotret, and the province of Saskatchewan's Environment and Public Safety Minister, Grant Hodgins, announced the formation of a new joint-review panel, to "review the proposed uranium mine developments in Northern Saskatchewan, and assess their acceptability." The review panel will "...focus on the environmental, health, safety, and socio-economic impacts of the proposed developments," and then report to the appropriate Ministers. The joint review will displace the separate, and sometimes redundant, reviews by the federal government and the provincial government.

The review panel will consist of four to seven members; the selection process for the members is currently underway. The panel will invite public comment and hold public hearings on issues regarding specific mine developments, as well as issues regarding guidelines for future submittals by developers to the committee.

Once the panel member selection is completed, the panel will have eighteen months to complete its final report on each of the proposals for the three proposed developments for which an Environmental Impact Statement (EIS) has already been submitted. These three proposed developments are Amok Ltd.'s Dominique-Janine Extension (of the Cluff Lake Project), Midwest Joint Venture's South McMahon Lake Project, and Minatco Ltd.'s Wolly (McClean Lake) Project.

For the two proposed developments that have yet to submit an EIS (the McArthur River Joint Venture's McArthur River Project and the Cigar Lake Mining Corporation's Cigar Lake Project), the review panel will solicit and review public comment, and then issue guidelines for EIS submittal to the developer of each project. Once the panel has received the EIS, the panel must respond with its final report in ten months. However, no deadline for guideline preparation was included in the initial press release.

Cameco's Eagle Point Project received it environmental approval in 1988 and is currently in test mine development. While this project is not mentioned as one of the projects the panel will review, it is possible that any expansion beyond the test mining stage will require the panel's review before a commercial-production permit is considered.

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WASHINGTON FOCUS

by Linda L. Gunter

As Spring blossoms in Washington, so have legislative initiatives on national energy policy. The Senate Energy & Natural Resources Committee held more than 15 hearings, and then began to markup Sen. J. Bennett Johnston's (D-LA) omnibus energy bill (S 341). Included in that markup was S 210, Sen. Wendell Ford's (D-KY) uranium enrichment restructuring bill. The House also considered energy policy legislation, and two committees held hearings on enrichment issues. Sen. Malcolm Wallop (R-WY), in an April 15 speech to the Johns Hopkins University International Energy Program, called on President Bush to lead Congress to establish a national energy strategy. Wallop said Congress alone cannot convince the American public to build new nuclear reactors or allow exploration of the Arctic National Wildlife Refuge· that there must "be a forceful Presidential presence...". On April 1, US utilities sent DOE notices terminating all or a portion of their USEC for the years 1996, 2000, and 2001. The NRC and FEMA have published their proposed user fees for licensing nuclear facilities. President Bush announced his plan to nominate Ivan Selin, currently with the State Department, to replace Kenneth Carr as NRC Chairman, when Carr's term expires in June. Both the House of Representatives and the Senate have passed Budget Resolutions that reflect small changes in overall spending authority for FY 1992. Thus, the appropriation committees will hold hearings within the next two months to allocate funds for specific programs.

USEC Termination Notices

◇ Whereas last year DOE postponed the 10-year notices on enrichment contracts for utilities, this year, notification on both 5-year (1996) and 10-year (2000 and 2001) notices were required on April 1. While most utilities remained committed to taking 70 percent of their requirements from DOE in 1996, 30 US utilities opted to terminate 100 percent of their requirements in 2000, and 31 utilities terminated 100 percent for 2001. Of those utilities which stayed with DOE in 2000 and 2001, the majority reduced their commitments to 70 percent or less.

Uranium Enrichment Restructuring Hearing

◇ On April 10, the Energy & Power Subcommittee held a hearing on all bills introduced in the House regarding restructuring DOE's uranium enrichment program. Three panels of witnesses—one Congressional, one from the administration, and one from the private sector—called on the House to consider the problems of the program and options for resolving them. DOE Assistant Secretary for Nuclear Energy, Bill Young, announced that DOE has written a new enrichment restructuring bill that will be sent to Congress as soon as it receives OMB clearance. DOE will ask for a revolving fund to allow the program to retain profits from one fiscal year to the next, rather than returning money to the Treasury. Committee members expressed dissatisfaction that unresolved issues still include funding for decommissioning and decontamination (D&D) of the gaseous diffusion plants (GDP) and environmental cleanup, the consequences of a corporate default on its bonds, and the uncertain status of the atomic vapor laser isotope separation (AVLIS) program. The members expressed concern about the effect of these factors on DOE's long-term competitiveness.

DOE was criticized for its decision not to fund any deployment activities beyond this year. The General Accounting Office (GAO) testified on the AVLIS program and concluded that DOE will not have completed enough of the demonstration program to arrive at an accurate estimate of the deployment cost by the end of 1992, the original target date. The GAO urged DOE to continue with some predeployment activities, even though most were terminated because of DOE's decision to request no money for FY 1992. In particular, continuation of NRC licensing for AVLIS and an accurate assessment of the scope and costs for D&D are crucial prior to privatization of the program. Nick Timbers, Managing Director of Smith Barney, testified that Congress should increase the proposed amount of

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borrowing authority from $2.5 billion to $6 billion in order to remain on schedule for AVLIS deployment and to maintain the GDPs.

Rep. Michael Synar (D-OK), who chaired the hearing for Rep. Sharp, concluded the hearing by saying the program is in serious difficulty. He believes something should be done, but also expressed skepticism that any of the solutions presented during the hearing were sufficient to fix the program. But as Sen. Ford said in his testimony, "we cannot just close the books and walk away from the enrichment plants..." because of D&D and the need for environmental cleanup funds. Sen. Ford claimed that the Senate will pass his bill again, and that he looks forward to working with House members to arrive at a compromise on the issue this year.

Enrichment Restructuring Bill Markup

◇ On April 23, the Senate Energy & Natural Resources Committee, as part of its markup of S 341, the Comprehensive National Security Energy Act, took up Sen. Ford's uranium enrichment restructuring bill (S 210). The bill was marked up as Title XIV of S 341, and also as a stand alone bill, thus allowing Sen. Ford to bring S 210 to the Senate floor for a vote as soon as the committee has reported the bill (which will occur in May). Aside from some technical amendments which are not substantial, an amendment from Sen. Wallop was included by unanimous consent. The Wallop amendment requires the International Trade Commission (ITC) to investigate the exports of uranium and enriched uranium from non-market economies, and to determine whether prices of this material are below the cost of production. The ITC must report its findings to the President and to Congress within one year. The amendment also requires utilities to report on the origin and seller of any uranium imported by the utility. Finally, DOE is authorized to purchase enriched uranium as long as the price paid is below its costs of production. If enriched uranium is purchased, any feed supplied by DOE's customers may be used by DOE only for inventory or overfeeding.

User Fees

◇ As part of the FY 1992 budget proceedings, both the Federal Emergency Management Agency (FEMA) and the NRC will issue rules on user fees. On April 8, the FEMA rule became effective, requiring nuclear plant licensees to pay for its services. The fees are for personnel and contractor services directly related to obtaining and maintaining an operating license, such as emergency plan review. On April 12, the NRC issued its proposed rule to collect its FY 1992 operating budget via user fees. For reactor licensees, the fees will increase from about $1 million per year to about $2.6 million per year. In order to allocate the costs among all categories of applicants, several changes to past procedures are proposed. The NRC plans to establish fees for export and import license applications that have been previously exempted. The export license fees are expected to range from $1,300 to $7,000 depending on the material or equipment exported and type of action required. For costs not attributable to power reactors, the NRC will establish annual fees for fuel cycle and materials licensees. For converters and fabricators, the annual fee per facility is expected to range between $300,000 and $2.3 million, depending upon the type of license. Transportation fees also will be collected through issuance of a certificate of compliance for approved casks, packages, and shipping containers. Fees range between $11,000 and $71,500 per year for these certificates. The annual fee for quality assurance program approval is $500 for each "use only" approval and $9,100 for each "use and fabrication" approval.

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While the NRC has attempted a fair allocation of costs according to its determination of the party most benefitted, some regulatory activities are more difficult to categorize. According to the proposed rule, if the Commission decides not to recover the costs of export licensing under *CFR Part 170*, then the NRC will recover these costs with an additional assessment to operators of power reactors. Generic uranium activities which the NRC cannot attribute to any category, such as international cooperation on safeguards, non-proliferation work, and establishment of the regulatory framework for enrichment facilities, are allocated to power reactor licensees. However, once the NRC issues a uranium enrichment facility license, the Commission will reconsider the assessment of generic costs to those licensed facilities. Other costs, such as NRC review of DOE's work at West Valley and cleanup of old uranium mill tailings sites under the Uranium Mill Tailings Radiation Control Act (UMTRA), also would be collected from reactor operators. Industry has until May 13 to submit comments on the proposed rule.

AVLIS Budget Hearing

◇ The House Energy R&D subcommittee convened a hearing on April 10 to consider DOE's AVLIS program budget. During the hearing, DOE was forced to defend its decision to defer deployment spending until a government corporation is created. Testimony from Lawrence Livermore National Laboratory and Martin Marietta indicate the research and development program is successful and on schedule. Although an integrated test of the laser and separator systems is scheduled for December 1991, the demonstration facility will not necessarily be identical to the production facility, allowing inclusion of further technological improvements, primarily in the laser. Lawrence Livermore testified that the demonstration design should prove what is necessary for a full scale plant. This testimony was questioned by Chairman Marilyn Lloyd, the GAO, and the industry witness, Mr. Gene Miles of Westinghouse.

All the witnesses felt DOE should reconsider its decision not to continue the request for quotation for a commercial deployment contractor. Lawrence Livermore asked Congress to add $25 million to the FY 1992 budget for essential predeployment activities. Mr. Miles testified that private sector expertise is essential to demonstrate AVLIS technology. He noted widespread industry concern that the selection of metal, rather than gas, for the feed and product will be a critical factor in AVLIS's integration into the fuel cycle, and a private company's input on those costs is essential.

DOE announced the only predeployment activities it will continue in FY 1991 are those activities related to site selection. DOE Assistant Secretary Bill Young announced that DOE has selected three sites for further characterization: the three current sites of gas diffusion plants. Work on data collection for completion of environmental impact statements for the three sites will continue this year.

The Edison Electric Institute's Nuclear Fuel Committee has published a report "DOE AVLIS Program: An Industry Assessment". The report takes a critical look at the AVLIS program and considers whether the industry should continue to support deployment. In particular, it expresses concern about production cost estimates and the belief that DOE needs to continue working on deployment.

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RECENT DEVELOPMENTS

INDUSTRY BRIEFS

Ontario Hydro to Cancel Denison Contract after 1992

On April 29, Ontario Hydro notified Denison Mines Ltd. that Ontario Hydro will terminate its supply contract for over 3 million pounds of uranium per year, effective January 11, 1993. Since Ontario Hydro is Denison's sole customer for its Elliot Lake production, and Denison has stated its production costs at the Elliot Lake production center are not competitive in the current world market, Denison has announced it will close Elliot Lake operations once deliveries to Ontario Hydro are completed.

Denison's president, Bill James, recently stated that the company is currently reviewing its earlier announced plan for layoffs and temporary plant closures (April 1991 Monthly Report #272). Instead, he says, Denison is likely to maintain production at current levels until enough product is on hand to fulfill the contract, which is expected to be in April 1992, before closing the Elliot Lake facility.

EC Removes Its Sanctions Against South Africa

In recognition of South Africa's progress towards ending apartheid, the European Community (EC) has removed the last EC-imposed sanctions, which applied to iron, steel, and gold coins. However, the EC is maintaining its support of UN sanctions, which apply to sporting events, arms, and crude oil.

The US State Department is still requiring that South Africa remove laws that classify people by race, and free all political prisoners before the USA will lift its sanctions.

◆◆◆

DOE Announces Enrichment Price for FY 1992

The DOE (US Department of Energy) announced on April 3 its price for enrichment services (under the Utility Services Contract) for fiscal year 1992. The current charge of $117.85 per SWU is increased by 3.1 percent, to $121.50 per SWU.

◆◆◆

Soviet Union Gives Up Ownership in Wismut Mines

The Soviet and German governments have reached an agreement, to be signed May 16, whereby the Soviet Union gives up its 50-percent share of the Wismut mines to Germany, in exchange for a release from liability for any environmental cleanup at the mines.

South African U Production Drops 25% in 1st Quarter

South Africa's uranium production fell by 25 percent during the first quarter of 1991. Members of the Chamber of Mines who produce uranium (as a by-product of gold production) reported the following production:

Mine	1,000 lbs U_3O_8	% Change from 4th Q 90
Buffelsfontein	138	– 14%
ERGO	3	– 93%
Hartebeestfontein	139	– 20%
Vaal Reefs	555	– 29%
Western Areas	155	– 9%
TOTAL	990	

◆◆◆

Cogema to Close U Division at La Crouzille by 1995

Cogema of France announced it will close mining operations at La Crouzille by 1995, citing that known reserves will only support another five years of production, and that mining costs exceed world prices. The La Crouzille division, located in the Haute-Vienne region, has 10 mines with 600 employees, producing 40 percent of France's current uranium production.

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SOVIET UNION'S ENERGY SITUATION

The Soviet Union is a country of vast sources of energy supply including oil, natural gas, coal, uranium, and hydropower, all of which are used in varying degrees to supply its energy needs. In spite of this wealth of resources, the Soviet Union has difficulty meeting its demand for energy. Opinions on the situation vary, from those who claim the country is in the midst of an energy crisis to those who argue that distribution is the only difficulty. But in any event, the unfortunate fact is that in some areas of the country, energy needs exceed its availability. Until recently, Soviet energy policy concentrated on supply. With the release of its 1983 Energy Program however, the Soviet Union acknowledged the necessity of a fundamental shift in energy policy from the supply side to the demand side in order to curb energy consumption.

ENERGY DEMAND

Energy consumption in the Soviet Union is dominated by natural gas at 39%, followed closely by oil (32%), and coal (22%—**Figure 1**). One of the major challenges facing the Soviet economy is its very high rate of energy consumption per unit of output. For instance, in 1980 the Soviet Union consumed 32 percent more energy per unit of gross national product than did the USA.

For years, consumption has increased because government subsidies have insulated consumers from price hikes. A prime example of the difficulty was the reaction of the Soviet economy to oil shortages caused by domestic production shortfalls during the 1970s. The Soviet economy, as well as that of the USA and other countries, had grown significantly with the stimulus of cheap oil. However, the shortage of oil in the 1970s forced those economies to change. Rather than urging conservation, the Soviet government implemented massive campaigns to boost oil and gas production and to augment its nuclear power program. But because of government subsidies, there were no price increases, and the excess production may have even encouraged less frugal consumption patterns.

In addition to excessive consumption of oil, the Soviet Union also suffers from an inadequate supply of electrical power. Although new electrical generating capacity has been added, it has not been added fast enough to meet increasing demand. Only four of the country's 15 republics generate enough electricity to meet their own needs: Russia, Kazakhstan, Turkmenistan, and Azerbaijan. The federal government has had plans in place to increase total generating capacity; yet supply has fallen short by 60 thousand to 80 thousand GWH for each of the past two years. Power reserves in the Soviet Union's Unified Energy System have dropped to only seven percent of annual peak load. Other major countries average four times that percentage.

Nationwide conservation has been so difficult because the primary consumer has been industry. Since energy consumption is more difficult and expensive to alter in the industrial sector than the residential sector, the historical emphasis has been on increasing energy supply, rather than conservation. The industrial sector accounts for over 50 percent of total energy consumption in the Soviet Union, largely because energy-intensive sectors such as metallurgy dominate Soviet industry. Soviet industry consumes nearly 60 percent more energy per unit of value added than other industrial countries, such as the USA.

ENERGY SUPPLY

Oil

Oil, the Soviet Union's most important source of energy, contributes the largest share of the country's total energy mix (**Figure 2**); it is one of three primary fuels used to

Figure 1
Total Soviet Energy Consumption

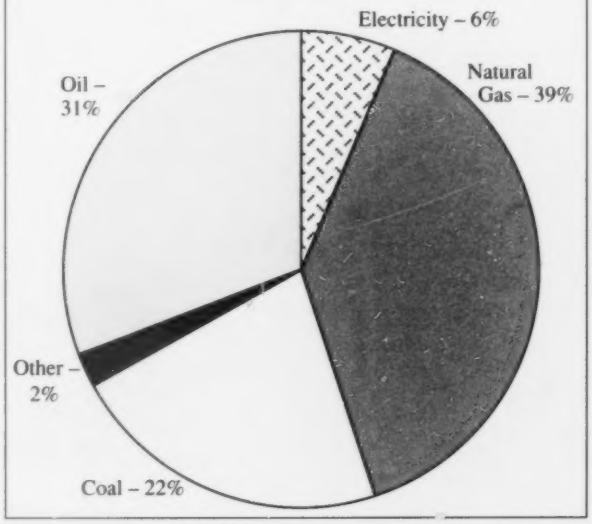

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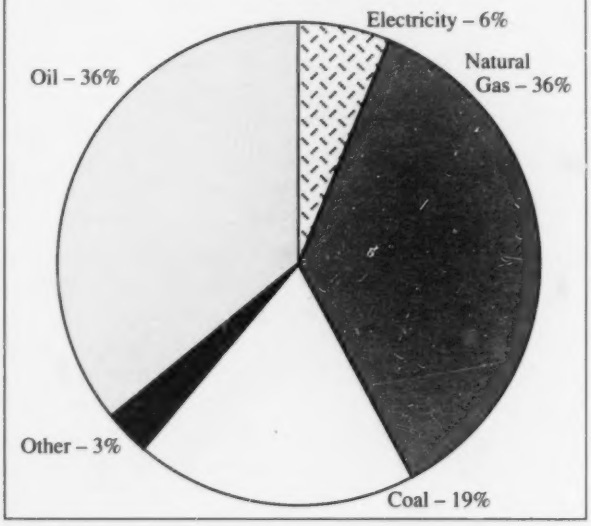
Figure 2
Total Soviet Energy Production



produce electricity in the Soviet Union. Thermal power stations, fueled by oil, coal, or natural gas, generate three-fourths of the nation's electricity.

The Soviet Union is the world's largest oil producer, and has vast untapped reserves estimated at 50 billion barrels, comparable only to the reserves of Saudi Arabia or Kuwait. The Soviet oil industry produces about 12 million barrels of oil equivalent per day (MBOE/d), compared to Saudi Arabia, which produces about 5 MBOE/d, and all of OPEC combined, about 24 MBOE/d. The Tyumen province in western Siberia is the Soviet Union's most important oil-producing area, accounting for over two-thirds of the country's oil output.

The oil sector is facing many challenges that affect economic production of the country's primary energy source and its most important export. These challenges include:

- Depletion of the largest and most accessible reserves in western Siberia. These vast deposits, which sustained the industry for years, are nearing the end of their economic viability.
- Rapidly rising costs of recovery. As the large, easily accessible deposits are depleted, more wells are needed to find and exploit smaller, more isolated deposits.
- High levels of waste and neglect of capital equipment. The former production habits common during the 1960s and 1970s encouraged immediate results, so maintenance of equipment and facilities was neglected, or often not performed.
- Aging and inefficient infrastructure. Since short-term results were encouraged, the infrastructures necessary for long-term growth were never fully developed. Thus, labor problems abound, transportation is often difficult, and now, when new deposits must be exploited, the infrastructure is not available to tap these resources economically.
- Inefficient use of oil. As with all forms of energy in the Soviet Union, consumers are inefficient in their use of oil. Additionally, refineries have also been neglected and have not adapted to the changing fuel needs of the country. Light oil products are in much higher demand, and the old technology at most refineries cannot economically produce sufficient quantities. In fact, in 1990, the Soviet Union exported crude oil, but actually became a net importer of refined petroleum products, such as gasoline.

Reserves difficult to recover economically using current Soviet technology are fast becoming a large portion of the country's total untapped resources. Thus, the oil industry needs major capital improvements to be able to access its vast natural wealth. But with the current economic situation in the Soviet Union, the necessary funds are difficult to obtain. Numerous ventures with Western oil companies are currently being negotiated to develop the huge untapped reserves of eastern Siberia. Agreements under negotiation with companies such as Chevron, Exxon, Royal Dutch/Shell, and British Petroleum could provide the necessary influx of capital to develop these oilfields.

Natural Gas

Natural gas contributes as much energy to the country's total energy mix as oil. Gas-fired stations are the largest source of electricity for the Soviet Union, and their share of total electricity generation is growing. As recently as 1982, the natural gas contribution to total electricity generation was less than that of coal or oil, but aggressive efforts by the government have made natural gas the primary fuel source for electricity. The Soviet Union holds

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massive reserves of natural gas, perhaps as much as 40 percent of the world's reserves. The largest deposits are located in Tyumen in western Siberia, the same area as the country's largest oil deposits. The other major Soviet gas-producing region is located in central Asia, in the republics of Uzbekistan, Turkmenistan, and Kazakhstan.

Challenges to the natural gas industry are similar to those facing the oil industry: aging production equipment and an inadequate infrastructure. The pipelines that transport gas across the country are also in poor condition, and serious explosions from leaking pipes have occurred. The government is working to remedy the inadequate pipeline system, but the country has thousands of miles of pipe in need of repair, and limited capital to fund the repairs.

Environmental and social challenges also face the gas industry. Exploitation of some of the gas deposits in northern Siberia has drastically affected the fragile environment and the way of life of the native residents of the region. In response to local protests, the government has postponed development of some of the most sensitive areas and will focus its exploration and development efforts on two less politically sensitive deposits.

While the gas industry is not without its problems, it is in better condition than any other energy sector in the Soviet Union. Severe problems in the coal and nuclear industries have limited their contributions to Soviet energy production, and persistent problems with inefficient consumption by industry and consumers have led the Soviet government to try to compensate by boosting production targets for natural gas. Recognizing the benefits that gas exports can bring to the country's economy, the Soviet government is encouraging gas production by providing limited capital assistance to the industry.

Coal

Coal contributes 19 percent of total Soviet energy production, and accounts for over 22 percent of the country's electricity generation. Just as with oil and natural gas, the Soviet Union's coal reserves are vast, estimated at over 270 billion tons of recoverable reserves. This includes reserves from the Donbas coal region in the Ukraine, and also reserves in Siberia and Central Asia. The Donbas coal region is the country's largest coal-producing area, although production has recently been reduced due to increasing production depths and lower caloric value of the coal. Total Soviet coal production peaked in 1988 at 772 million metric tons, but has fallen to about 760 million metric tons per year since that time.

The Soviet coal industry is experiencing some major difficulties, the most immediate of which is the breakdown of labor-management relations. A nationwide coal miners' strike in 1989 resulted from poor and unsafe working conditions, as well as inadequate housing and wages for miners. Because of the government's eagerness to settle the strike quickly, and thus prevent it from spreading to the railway and steel industries, officials accepted very stringent terms, many of which they have been unable to implement. Consequently, many of the miners' demands have not yet been fulfilled.

Another major problem is the new government strategy of devoting its resources to development of new coal fields at remote locations in Siberia and south-central Asia. The Donbas deposit is located nearer the population centers, but its reserves are declining in quality (falling heat content; rising ash content). The newly developed reserves at greater distances from demand centers accentuate the inadequacies of the poorly maintained rail transportation system.

Much of the coal being mined in the eastern coal fields is of lower quality than that produced at Donbas; only coal from the Kuzbas deposit is of comparable quality. Also, the coal from Kuzbas is the only eastern-mine coal that can be transported long distances, since the coal of the other mines can easily self-ignite during transport.

To address these problems, government strategy called for construction of eight major coal-fired power stations next to the mines, to generate electricity to be sent by high-voltage power lines to western Soviet population centers. However, strong environmental protest to the plants and power lines has effectively reduced the plan to only two power stations, lessening the demand for coal, thereby creating unused production capacity.

The coal industry may be further hindered by a growing public and scientific awareness of the pollution and potential global warming effects from coal-fired stations. The industry and the power it can provide are vital to the country and its economy, but labor relations, coal quality, transportation, and environmental concerns present major obstacles.

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Nuclear Power

After the USA and France, the Soviet Union is the third-largest nuclear electric generating country in the world. In 1989, nuclear power generated 212,600 GWH of electricity, which represents about 12.5 percent of the total Soviet electricity generation (**Figure 3**). The average load factor in 1989 for all of the operating nuclear plants was 69.3 percent.

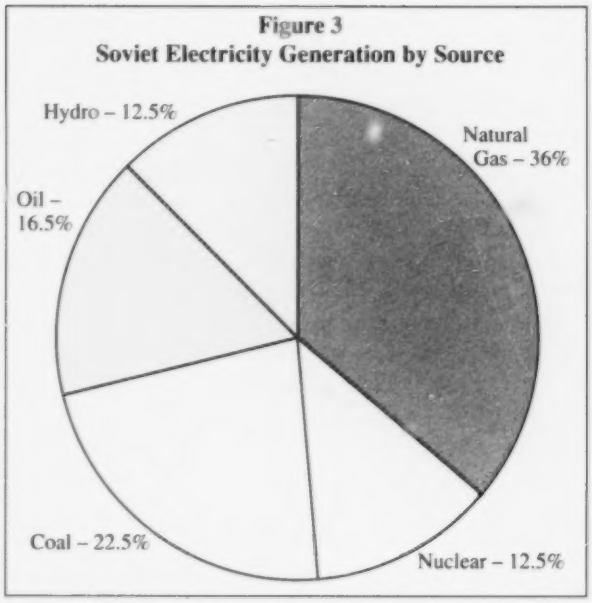
The Soviet Union currently operates 47 commercial power reactors at sixteen different stations with a total generating capacity of 33,810 MWe net. This includes 25 VVERs (similar to pressurized water reactors), 20 RBMKs (graphite moderated, channel-type reactors), and 2 FBRs (fast breeder reactors). Ten reactors are still under construction, and the country also has a number of nuclear-powered district heating stations operating and under construction.

The Soviet Union's operating nuclear power stations are located primarily in the western part of the country, where the large majority of the 280 million Soviet citizens live. The stations are located in four of the 15 different republics that make up the Soviet Union. Nine stations are located in Russia, the country's largest republic; the others are located in the Ukraine, Lithuania, and Kazakhstan (**Figure 4**). Two new reactors (Smolensk 3 and Zaporozhe 5) began commercial operation in the past year or so, but plans for additional reactors have been cancelled or indefinitely postponed. Several units, both operating and under construction, have been shut down or cancelled.

The Soviet Union's nuclear program is experiencing the same challenges of reactor safety, waste disposal, and public acceptance facing Western nuclear programs. The government's 1985 five-year plan called for nuclear power to provide 20 percent of the country's electrical power by 1990; actual output was approximately 12 percent—a shortfall of greater than 150 thousand GWH. Public pressure in the late 1980s delayed or stopped nuclear projects totalling over 100 gigawatts. A few years ago it was unthinkable that local opposition would be able to halt construction. But since the Chernobyl accident in 1986, the government has increased its emphasis on safety at its facilities and recently has begun responding to local concerns.

The Soviet government remains firmly committed to nuclear power because it realizes the country's need for energy supplies to further economic growth.

Figure 3
Soviet Electricity Generation by Source



The government announced in 1990 that it will concentrate on building VVER–1000 reactors, with the assistance of Western safety expertise. Pro-nuclear groups within the government stress that emotional opposition is threatening nuclear power, and that this major source of power must be sustained and play a vital role in the development of the country.

Hydroelectric Power

Hydroelectric power generation has grown slowly in the Soviet Union, but has actually decreased as a percentage of total electricity generation. Government plans called for hydropower to contribute 14 percent of the nation's electricity generation by 1990, and to gradually increase its contribution each year. Hydroelectric power did manage to contribute nearly 13 percent of the nation's electricity generation in 1989, but its contribution subsequently decreased.

Massive hydroelectric projects were planned for Siberia, the northern Caucasus, the Baltics, central Asia, and several stations along the Volga River. Yet environmental concerns have significantly slowed progress of these projects. n addition, the wide seasonal fluctuations in water levels on most Siberian rivers have made large hydroelectric stations less economic than originally expected.

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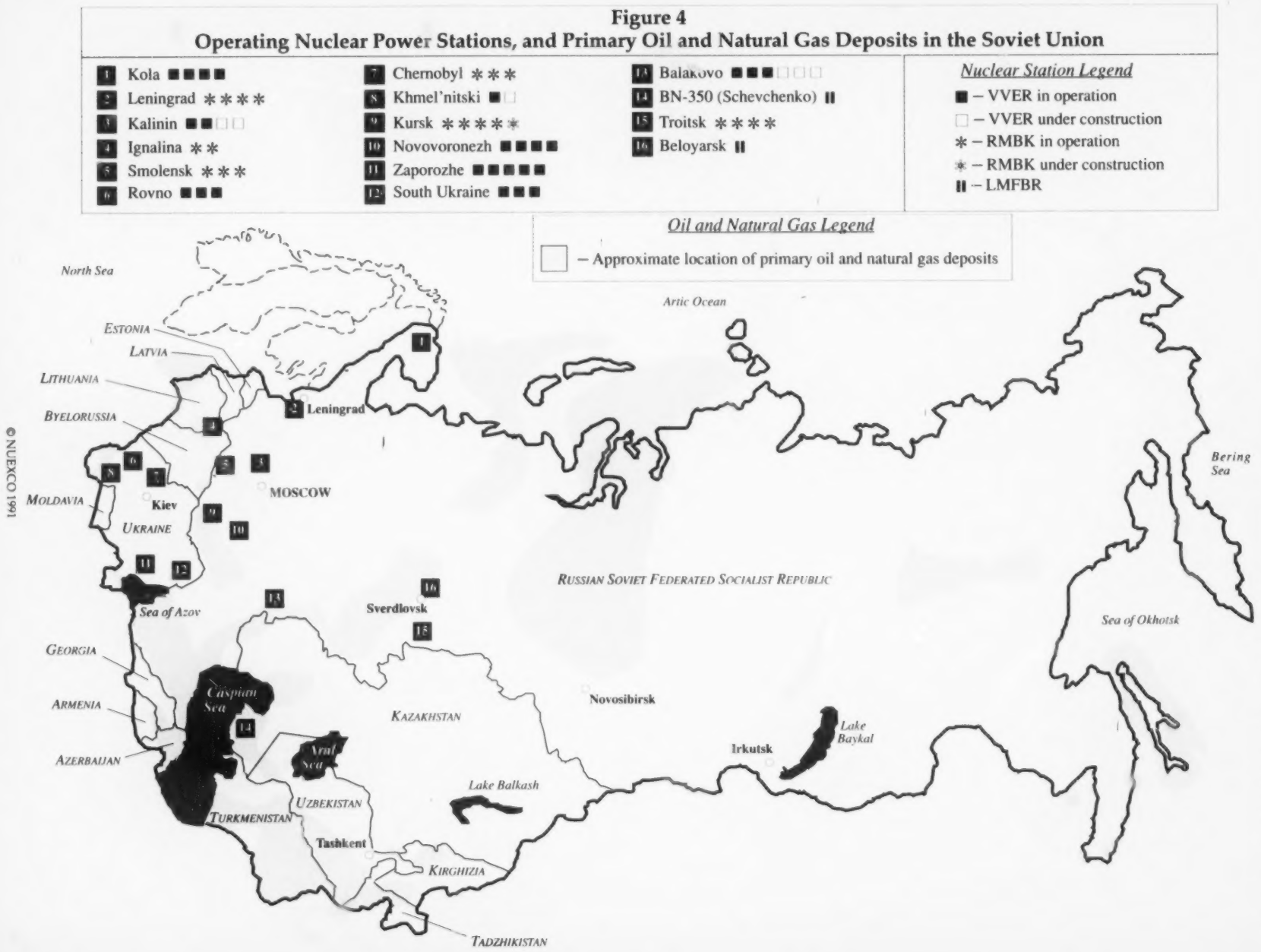
Figure 4
Operating Nuclear Power Stations, and Primary Oil and Natural Gas Deposits in the Soviet Union



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EXPORTS

Energy exports are a vital source of hard currency to the Soviet Union. In 1988, the country exported about 35 percent of its domestic oil production and 12 percent of its natural gas production. Oil and natural gas exports together accounted for over 40 percent of the country's entire convertible currency earnings in 1988. Energy exports accounted for 17 percent of total consumption.

The Soviet government recognizes that energy exports are essential. Until the country is more fully developed and can successfully export quality manufactured goods to Western countries, raw material exports are the Soviet Union's most important source of hard currency. Demand for convertible currency is increasing in proportion to the country's demand for consumer and industrial goods from the West. Thus, increases in energy exports are needed to make a significant improvement in the country's convertible currency earnings.

The Soviet Union finds itself in a difficult situation: it needs convertible currency to import equipment needed for major capital improvements, but without the improvements, it cannot economically recover its raw material resources, which are the country's primary means of generating convertible currency.

OUTLOOK

In 1989, a major review of Soviet energy policy was released, based on the findings of an expert commission that had been at work since 1985. The review resulted in the following recommendations:

- A major new commitment to energy conservation, starting with sharp price increases for energy.
- A reduced, though still substantial, commitment to nuclear power.
- A stabilization of oil and condensate output.
- A continued rapid expansion of natural gas output, and displacement of oil by gas throughout the economy.
- A radical modernization and expansion of the equipment and construction industries serving the energy sector.
- A continued commitment to energy exports.

The commission's primary objective was to provide a practical strategy for handling the transition from a production-oriented to a demand-oriented energy policy. This strategy involves dividing the move toward conservation into two stages—one of preparation and one of active execution. On the supply side, the first phase concentrates on the stabilization of oil output, while vigorously developing gas and nuclear power. On the demand side, the commission stressed measures that would not require large investments, but would prepare the way for the second stage. These measures included improvements in measurement of consumption, oversight, accountability, and incentives (price increases).

In the second stage, reductions in consumption are expected from modernization of technological processes and further electrification of industry. Additional reductions are expected from lower use of energy-intensive materials. Energy consumption by industry and construction in the Soviet Union, although high by Western standards, is already declining. Heavy industry is giving way to advanced technology sectors, such as electronics, robotics, and computers. Chemistry and machine building are expected to increase in relative importance, while sectors such as ferrous metallurgy are expected to decline.

The plan is an optimistic one, requiring increases of over 20 percent of the country's total investment budget for the next 15 to 20 years. However, such increases are essential if the Soviet Union is to accomplish its long-term goal—the transition to energy conservation with simultaneous protection of the economy's energy supply.

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JABILUKA URANIUM PROJECT

The Jabiluka gold and uranium deposit in the Northern Territory of Australia is the world's largest known primary uranium deposit. Exploration first began in 1968, and in March 1971 Pancontinental Mining Ltd. acquired a "Prospecting Authority" for an area of 186 square kilometers within the Alligator River area of the Northern Territory. The Jabiluka One orebody was discovered later that year through a ground reconnaissance spectrometry survey. The Prospecting Authority was converted to an Exploration License in March 1972. In 1973, the Jabiluka Two orebody was discovered by drilling to the east and along the strike of Jabiluka One.

Land holdings under the Exploration Permit were progressively reduced, as required by law, during the period 1972-1977, but other leases were acquired to cover supplemental areas and to provide for the extraction of gold and other minerals. Feasibility studies, permitting, and substantial marketing were completed by December 1982. However, with the advent of Australia's three-mine policy, project approval was withdrawn by the Labor Government in 1983. To date, the Jabiluka project remains undeveloped, and the Australian Labor Party's review of its three-mine policy during its biennial convention this summer will determine the future of the project for this decade.

Ownership

The Jabiluka uranium property is owned jointly by Pancontinental Mining Limited (65 percent) and Texaco Oil Development Company (35 percent). Pancontinental's option to purchase Texaco's share in the project was extended one year, to November 1991. Pancontinental likely will exercise that option when the project receives development approval from the government.

Pancontinental Mining Limited, an Australian-owned and controlled diversified mining company, was founded in 1970. Its initial objective was mineral exploration, with an emphasis on uranium. Currently, the principal activities of Pancontinental and its subsidiaries consist of gold and coal production in Australia. Production of tantalum and base metals is expected to commence shortly, and a decision is imminent concerning a magnesite development that could begin operations in late 1991.

Pancontinental is currently in a state of flux, both structurally and financially. The company's half-year results for the period ending December 31, 1990 included a loss of A$83.7 million, after write-offs of A$87.8 million. Early in 1991, the company reported the sale of several non-core assets, including its 38-percent share in the Canadian-based company, Pancontinental Oil Ltd., and a 9.6 percent shareholding in itself. Although the company raised A$28 million from the sale of its oil and gas interests, and an additional A$22 million from the sale of Pancontinental shares, these sales resulted in losses to the company. A portion of these losses were written off against "listed and other investments" in the half-year results. The funds raised through the asset sales will reduce the company's level of debt, which may aid in a refinancing package which is currently underway.

In addition to this financial restructuring, significant corporate restructuring is also underway. Mr. Tony Gray stepped down as Pancontinental Mining's Chief Executive, although retaining his position as Executive Chairman. As a result, Pancontinental is now in the process of recruiting a new Chief Executive. This task is being performed by a newly established board committee, which also has responsibility for non-strategic asset sales, improving management efficiency, and reducing costs.

During 1990 and early 1991, four companies increased their holdings in Pancontinental. Major shareholders and their respective ownership shares in the company currently include:

Cogema Australia Pty Limited	14.9%
Degussa AG	14.0%
North Broken Hill Peko Limited	13.8%
Rheinbraun Australia Pty Limited	5.4%

Location

The Jabiluka uranium and gold deposits occur in the East Alligator River region, about 225 kilometers east of Darwin (**Figure 1**). The Alligator River region consists of an extensive lowland (10 to 50 meters above sea level), with floodplains, seasonal drainage channels, and waterholes. Jabiluka is located at the western margin of the Arnhem Land Plateau, a sandstone escarpment that rises 250 meters above the lowlands.

Access to the project is via the all-weather Arnhem Highway, thence 16 km along an unsurfaced road. An airstrip is available at Jabiru, 16 km to the south, with

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Figure 1
URANIUM DEPOSITS OF AUSTRALIA

commercial airline service operating out of the airport at Darwin. No operational rail lines exist within 1,100 km of the Jabiluka deposits, although a 500 km rail line operated out of Darwin at one time.

The Jabiluka deposits are situated within, although excluded from, the Kakadu National Park, which encompasses two-thirds of the Alligator River region. The Park has been included in the World Heritage List, which identifies areas of "outstanding universal value." Enclosed within the Park are sacred or mythological sites significant to Aboriginal peoples of the area. internationally important wetlands, mangroves of scientific interest, and extensive archeological sites.

Property Rights

Property rights to uranium exploration and development in Australia's Northern Territory (NT) are governed, primarily, by the Northern Territory Mining Act of 1980. This Act provides the framework for both exploration licenses and mining leases.

Title to uranium deposits in the NT is vested in the federal government, and thus, the provisions of the Mining Act are also subject to Australia's Atomic Energy Act (AEA) of 1953. The AEA empowers the Australian Prime Minister to authorize exploration for, and production of, uranium. Pancontinental's property rights were consolidated into Mineral Lease MLN1 in August 1982. The lease covers 70 square kilometers and was issued for a period of 42 years.

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Where Aboriginal lands are involved, both the Mining Act and AEA are subject to the provisions of the Aboriginal Land Rights Act (Northern Territory)—1976. This Land Rights Act established Land Councils of local aborigines. The Councils control exploration and mining activities within their own lands. No exploration license may be granted to Aboriginal lands without Council approval.

To obtain a mining lease on land covered by the exploration license, a full statement of the proposed activity must be submitted to the relevant Land Council. The Council and the company requesting the lease must then agree on the terms and conditions of the lease. If agreement cannot be reached, the questions may be resolved by conciliation or arbitration. The company need not be bound by such resolution, but the mining interest may be cancelled if the terms are not accepted. If the mining interest is cancelled, the land cannot be reopened for lease for five years.

Licensing

By the end of 1982, all necessary mining and environmental approvals for Jabiluka had been obtained from the Commonwealth and Northern Territory Government, and agreement with the Northern Land Council on behalf of the Aboriginal Associations had been reached. The Commonwealth had also issued Letters of Determination permitting developers to seek sales contracts. The Letters of Determination were withdrawn in 1983, however, by the incoming Labor Government and its limited production policy. The Jabiluka project is still undeveloped, awaiting a change in policy by the Australian Government.

Environment

In the 1970s, a massive production scheme of over 20 million pounds U_3O_8 per year was proposed for Jabiluka. Even though production plans have been scaled back, the huge production potential and the project's location in Kakadu National Park (the location of the filming of the popular Crocodile Dundee movies), drew increased attention. Such factors have increased the sensitivity of the project and provide the venue for potentially restrictive regulation.

When the Jabiluka project reaches the production stage, it will be required to fund much of its own environmental scrutiny through an export fee, which will pay for the activities of the Supervising Scientist of the Alligator River district, who provides oversight on uranium producers in that district. This export fee has been raised progressively from A$0.11 per kg U_3O_8, to A$0.80, to A$1.02, and finally, to A$1.30 per kg U_3O_8 in July 1989.

Marketing and Development

Before the formation of the Australian government's three mine policy in 1983, Pancontinental was actively marketing production from Jabiluka. Negotiations were underway with the British Civil Uranium Procurement Organization (BCUPO), which was buying uranium on behalf of the Central Electricity Governing Board (CEGB), to supply a minimum of 4.3 million pounds U_3O_8 over a ten-year period beginning in 1988. In addition, Nichimen had obtained exclusive distribution rights from Pancontinental for the sale of uranium in Japan. These plans, however, expired when an export license was denied in 1983.

Pancontinental is currently evaluating two basic options for development of the Jabiluka deposit. One option involves development through equity participation of potential utility customers in Asia, Europe, and the USA. This option would provide not only a source of development funding, but also a market for the uranium once production commenced.

A more likely alternative is development in conjunction with ERA, which is 65 percent owned by North Broken Hill Peko, one of Pancontinental's major shareholders. ERA operates the Ranger mine/mill complex, located only 15 km from Jabiluka. The Ranger No. 1 open pit mine, which has been in production since 1981, is expected to be mined out by mid-1993. Under the potential joint-venture development plan, ore from the Jabiluka deposit would be transported by truck, conveyor, or slurry pipeline to the Ranger site, where processing would occur. The Jabiluka deposit is larger and higher grade than the Ranger No. 3 orebody, which was originally scheduled for development upon exhaustion of the No. 1 orebody. One of the benefits of the Ranger-Jabiluka joint development option is the reduction in development costs that would result from using an already existing mill facility. It is also possible that the joint development plan could go forward without a change in the Australian government's current three-mine policy. Although the joint development option would be less environmentally sensitive than independent development, it is not without its own environmental concerns. The issues of ore transport, as well as the disposal and water management associated with increased tailings, have come under scrutiny.

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Capital Costs

Capital costs for the independent development of the Jabiluka project have been estimated by Pancontinental in the range of A$200 million to 250 million. At an exchange rate (May 1991) of US$0.78/A$1.00, the cost range would be US$156 million to 195 million. A 20-year depreciation period at a production rate of 3.3 million pounds U_3O_8 per year would result in a depreciation charge of approximately US$2.35 per pound U_3O_8.

Royalties

In 1982, Pancontinental reached an agreement with the Northern Land Council to provide a series of royalty payments to the traditional landowners. Royalties to be paid under the following terms were included in the draft agreement:

- After Ministerial approval of the project, A$1.0 million, and another A$800,000 over the next four years.
- For each of the five years after agreement is reached for the sale of at least 3,000 tonnes of uranium oxide, A$1.2-million per year; for three years starting one year after approval of the mining agreement, A$1.2 million per year.
- When production starts, A$3.4 million.

Royalties under the draft agreement would be 4.5 percent of Jabiluka's revenue, plus $500,000 a year for the first ten years, and thereafter, 5.0 percent of revenues.

URANIUM POLICY CONSIDERATIONS

The Australian political scene is dominated by two political groups: a conservative coalition of the urban-based Liberal Party and the rural-based National Party; and the Australian Labor Party (ALP).

The ALP is currently in power and has formulated Australia's existing uranium policy of limited production. The policy was set in July 1984 at the ALP's biennial national conference. This conference endorsed continued production at Nabarlek, expanded production at Ranger, and development of Olympic Dam, but rejected the development of other uranium deposits. The policy of the Liberal/National group holds that the development of Australian uranium production should be dictated by market forces alone. A principal concern of both groups is the non-proliferation of nuclear weapons; how this end is achieved provides the major policy difference. In the past, the ALP has supported limited production, while the conservatives believe the country should become more fully involved in all phases of the nuclear fuel cycle.

In addition to approval of specific projects, the current Australian uranium policy includes these other factors:

- The customer's government must have a bilateral safeguards agreement with the Australian government.
- Contractual terms must be within broad guidelines set down in Ministerial Determinations issued to each producer.
- All new contracts are subject to the approval of the Australian government. Approval is assured provided the producer stays within the guidelines set in the Determination.
- Export is subject to compliance with a Restricted (Dangerous) Goods permit issued by the Australian government.
- Foreign ownership of a uranium production facility is limited, nominally, to 25 percent.

Starting in 1986, the government began showing some signs of relaxing its strict policies. The government's increasing pragmatism was evident when it decided to allow Queensland Mines Limited (QML) to resume uranium shipments to Electricité de France (EdF). Those shipments had been banned for two years, and the Australian government had been purchasing the uranium that QML otherwise would have delivered to EdF. The ban had been imposed by Australia in an attempt to force curtailment of France's nuclear weapons testing in the South Pacific. However, it had become evident the ban was counter-productive: EdF was able to purchase uranium from other sources at lower prices, and the Australian government was forced to expend funds needed for other programs to purchase uranium for which Australia had no need. Furthermore, the ban had no effect on France's nuclear test program, and also brought into question Australia's reliability as a long-term uranium supplier. Lifting the ban was a victory for commercial reality over political rhetoric.

A primary obstacle impeding Australia's movement into the forefront of world uranium suppliers had been the government's strict floor price policy. By late 1989, this policy had been essentially rendered ineffective. The government had approved several long-term contacts well below the official floor price of A$31.00 per pound U_3O_8. The government also had issued a statement

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that future contract price levels would be "determined at a level which reflected the national interest in particular circumstances, and market conditions in which the contracts are negotiated".

The third restriction to growth, the government's three mine policy, is also under scrutiny. The current interpretation is that it is a three "named" mines policy; that is, it was intended to allow only three specific mines to operate. The policy states that mines at Nabarlek, Ranger, and Olympic Dam could produce. It does not assert that when one center shuts down (e.g., Nabarlek) a new facility can start up. However, this policy will be under review at the ALP's 1991 national conference. Currently, the Labor party is sharply divided over the issue; in general, the right faction supports new mines, while the left faction is pushing for uranium mining to be phased out altogether. Early this year, Primary Industries Minister, John Kerin, came out publicly in favor of overturning the current policy. Furthermore, in a five to three vote, the federal government's uranium policy review committee decided to recommend the development of new mines that meet stringent environmental and safety standards, as well as approval by local Aboriginal landowners.

For Australia, with its emphasis on long-term relationships, flexible and realistic policies are essential to its credibility as a reliable source of supply. It is in the long-term interest of the country's economic success that its policies continue to become more flexible.

GEOLOGY

Exploration History

The East Alligator River region became interesting to prospectors following a 1968 announcement by the Australian Bureau of Mineral Resources that Archean and Lower Proterozoic rocks had been tentatively identified in the area. This indicated a geologic, and possible mineralogic, analogy to that of the uranium-rich Rum Jungle region on the west side of the Pine Creek Geosynocline. Consequently, prospecting of the East Alligator River region began almost immediately. Due to the lack of rock outcroppings throughout the region, aerial surveys using radiation detection instruments became the favored exploration technique. These techniques led to the 1970 discoveries at Ranger, Nabarlek, and Koongarra, and to the 1971 discovery at Jabiluka.

Regional Geology

The Pine Creek Geosynocline represents the principal geologic feature of the entire region. Archean and Lower Proterozoic rocks have been moderately folded across the north/south trending synclinorium, which extends from the Rum Jungle area in the west, to the East Alligator River area in the east. The major uranium orebodies in the Northern Territory—Ranger No. 1 and No. 3, Koongarra, Jabiluka, and Nabarlek—all occur along the east flank of the synclinorium structure.

Sediments of Lower Proteozoic age were deposited over the Archean basement in sequences, starting with the Lower Mine Sequence, Upper Mine Sequence, and Hanging Wall Sequence of the Lower Cahill Formation, followed by the Upper Cahill Formation and the Nourlangia Schist. Each depositional sequence was intensely metamorphosed during renewed igneous activity consisting of intrusions of granite and pegmite and basic dikes, all considered to be related to the Nanambu basement complex. Evidence of brecciation occurs along formation contacts, fault and fracture zones, and alteration collapse features. Igneous activity and metamorphism began about 1,800 million years ago and ended about 1,650 million years ago.

Site Geology

The Jabiluka orebodies occur within the Cahill Formation, a sequence of Lower Proterozoic metasediments. The metasediments are overlain, unconformably, by the Kombolgie Sandstone. The metasediment sequence has been folded into an assymmetric syncline dipping 35 degrees on the northside and flat-lying on the southside. The Jabiluka One orebody outcrops through a erosional window of the Kombolgie Sandstone, while Jabiluka Two is covered by 20 to 70 meters of the Kombolgie.

The primary host for uranium mineralization at Jabiluka is the Main Mine Series Schist, which includes a series of schists totalling 15 to 70 meters in thickness. The components of these schists include chlorite, graphite, quartz, muscovite, chert, and dolomite.

Pitchblende and uraninite are the principal uranium minerals, occurring in both disseminated and massive forms. The uranium mineralization is associated with sulfides, particularly pyrite and chalcopyrite. Gold mineralization is associated with uranium mineralization in Jabiluka Two, and occurs within uraninite grains or as cross-cutting veinlets. Estimated current reserves are listed in **Table 1**.

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OPERATIONS

Mining

The Jabiluka deposit is the world's largest primary uranium deposit and contains substantial amounts of gold. Under the independent development plan proposed in 1979, the project would be developed as an underground mine with a production rate of about 2,000 tons of ore per day on a five-day week. The mill would operate seven days per week at about 1,500 tons per day. Once developed, Jabiluka would produce near its planned capacity of 3.3 million pounds U_3O_8 per year. The project also would produce up to 30,000 ounces of gold per year as a by-product.

A fully-mechanized, trackless mining system was planned in 1979. Under this plan, broken rock would be transferred through ore and waste passes to truck haulage levels connected to a central underground crushing system. Two declines (gradient 1:8)—one, a conveyor decline, and the other, a vehicular access with twin haulage decline—would provide mine access.

Three mining systems would be used to mine the ore body: open stoping, vertical crater retreat (VCR) stoping, and cut-and-fill stoping. Cut-and-fill methods are used in narrow lenses, which represent ten percent of the ore body.

In open stoping, the stope is developed with draw points in the footwall and drill drives in both the footwall and hanging wall. An initial raise connection is made through the stope using a raise borer. The raise is expanded to a narrow slot; a series of blast hole fans are drilled parallel to the slot and blasted sequentially into the opening. Broken ore is extracted after each blast. After completion, the stope is backfilled to permit extraction of the adjacent stope.

Table 1
ESTIMATED JABILUKA RESERVES

Deposit	Ore (1,000 tonnes)	Grade (% U_3O_8)	Contained U_3O_8 (1,000 tonnes)
Jabiluka One	1,300	0.25	3.4
Jabiluka Two [1]	52,000	0.39	204.0
Total	**53,300**	**0.39**	**207.4**

[1] Jabiluka Two also is estimated to contain 11,800 kg of gold at a grade of 10.7 g/t AU.

The VCR stoping method is similar to open stoping with similar initial development. However, the blast holes are large diameter (250 mm) and nearly vertical. The ore is blasted in horizontal slices downward, differing from open stoping in which the ore is blasted in vertical slices. These stopes would also be backfilled.

For open stoping and VCR stoping, the ore body would be divided into stoping blocks separated by pillars. The blocks would be subdivided into a series of individual stopes, with the primary stopes being mined by open stope methods and the secondary stopes, by VCR methods. Walls of the primary stopes would be rock; walls of the secondary stopes would be rock and cemented fill. Finally, pillars would be mined by the VCR stoping method.

It is expected that after initial dewatering during development, water inflow to the mine workings would be less than 400 liters per minute.

Both ore and waste would be crushed in an underground crushing station at a rate of up to 550 tonnes per hour. Crushed material would feed to an inclined belt that would convey the material to the mine portal, where a six-kilometer belt conveyor would transfer the ore to the treatment plant.

Milling

Mine-run ore feed would be crushed underground to 100 percent minus 200 mm and delivered to the mill site by conveyor. At the mill site, the ore would be crushed in a 2,150 mm secondary crusher and a 2,150 mm tertiary crusher, to produce a 100 percent minus 25 mm product.

The crushed ore would be wet ground in an open circuit rod mill (3.2-meter diameter by 4.9-meter long) followed by a ball mill (3.65-meter diameter by 5.97-meter long). The ball mill would operate in closed circuit with cyclones to produce a 50 percent minus 75 micron product.

The product would be thickened (in a 41 m thickener) to 60 percent solids, with the overflow returning to the grinding circuit. The thickened product would be air agitated in Pachuca tanks, to which sulfuric acid and pyrolusite (oxidant) would have been added. Pulp temperatures would be maintained at 40°C with steam. Treatment time would be 36 hours.

After leaching, the uranium-bearing solution would be separated from the solids in a counter-current decantation circuit consisting of a series of seven thickeners, 49 meters in diameter. The uranium-rich, pregnant solution would overflow the first thickener, and the washed solids would discharge from the last thickener. The pregnant solution would be clarified and filtered

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prior to solvent extraction. The washed solids (uranium tailings) then would be pumped to the gold flotation plant.

The clarified pregnant solution would be sequentially mixed with organic reagents in a four-stage extraction process where the uranium would be transferred to the organic phase. The uranium next would be stripped from the organic phase in a four-stage stripping circuit, producing a uranium-bearing ammonium sulfate solution ready for precipitation.

Uranium would be precipitated with ammonium gas that would increase the solution pH to 7.5. The ammonium diuranate precipitate would be thickened, dewatered, and roasted in a multiple-hearth furnace. After crushing to minus 6 mm, the yellowcake would be packaged for marketing.

The gold flotation-cyanidation plant would be designed initially to treat 3,200 tonnes per day of uranium tailings. The cyanidation circuit would be designed to treat 600 tonnes per day of flotation concentrates.

The uranium tailings feed to the flotation circuit would be first neutralized by lime to a pH of 7.0. In the flotation circuit, the gold and gold-bearing minerals would be selectively floated using reagents consisting of collectors, promoters, and frothing agents. The concentrates would be sent to the cyanidation plant; the tailings, to tailings disposal.

In the cyanidation plant, the concentrates first would be treated in Pachuca tanks with a cyanide solution to dissolve the gold. Lime would be added to maintain an alkaline environment. After leaching, the pregnant gold-bearing cyanide solution would be separated from the solids in a counter-current decantation system.

The pregnant solution, after clarification, would be treated with zinc dust to precipitate the gold. After filtering and drying, the precipitate would be melted with suitable fluxes to produce a saleable doré bullion bar. The cyanide process tailings would be washed to remove residual cyanide and pumped to the tailings neutralization circuit. As the Jabiluka project is undeveloped, final mine and treatment plant designs are still in a preliminary stage.

CONCLUSION

The Jabiluka uranium project has the potential to become one of the most important uranium projects in the world. Despite the financial and structural challenges facing Pancontinental, and the changing political policies in Australia, Jabiluka is well situated for development during the 1990s. With the availability of numerous financial and development alternatives, Jabiluka could, by the turn of the century, take its rightful place among the first rank of world uranium producers.

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NUEXCO

CALENDAR

NUCLEAR INDUSTRY CALENDAR

1991

June 2-6 ***American Nuclear Society Annual Meeting***
(Marriot Orlando World Center, Orlando, Florida).
Contact: ANS Meetings Department; 708-352-6611.

June 9-12 ***Nuclear Technology: Building Our Energy Future*** (Sheraton Cavalier Hotel, Saskatoon, Canada).
Sponsored by the Canadian Nuclear Association and the Canadian Nuclear Society.
Contact: Sylvie Caron, CNA; 416-977-6152; or Fax: 416-979-8356.

June 23-26 ***International Conference on Enrichment*** (The Westin Hotel, Washington, DC).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

Sept. 4-6 ***Uranium Institute Sixteenth Annual Symposium*** (London, UK).
Contact: Uranium Institute; 44-71-225-0303; or Fax: 44-71-225-0308.

Sept. 22-25 ***International Uranium Seminar '91*** (The Don Cesar Hotel, St. Petersburg/Tampa, Florida).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

Sept. 29-Oct. 2 ***American Mining Congress Mining Convention*** (Salt Lake City, Utah).
Contact: AMC Convention Office: 202-861-2800; or Fax: 202-861-7535.

Oct. 29-31 ***Uranium Hexafluoride Handling*** (William G. Pollard Auditorium, Oak Ridge, Tennessee).
Sponsored by Martin Marietta Energy Systems, Inc.
Contact: Diane Duck, MMES, 615-576-1676; or Fax: 615-576-1561.

Nov. 10-13 ***Nuclear Energy Forum*** (Westin St. Francis Hotel, San Francisco, California).
Sponsored by the U.S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

Nov. 10-15 ***American Nuclear Society Winter Meeting*** (Hilton Hotel, San Francisco, California).
Contact: ANS Meetings Department; 708-352-6611.

1992

April 12-16 ***8th Pacific Basin Conference*** (Taipei, Taiwan).
Sponsored by the Amercian Nuclear Society.
Contact: ANS Meetings Department; 708-352-6611.

Sept. 21-23 ***Second International Conference on Training for Operation & Maintenance in the Nuclear Industry***
(The Moat House International Hotel, Stratford-upon-Avon, United Kingdom).
Sponsored by the Institution of Nuclear Engineers.
Contact: INE Conference Secretary; 081-698-1500 or 081-698-4750; Fax: 018-695-6409.

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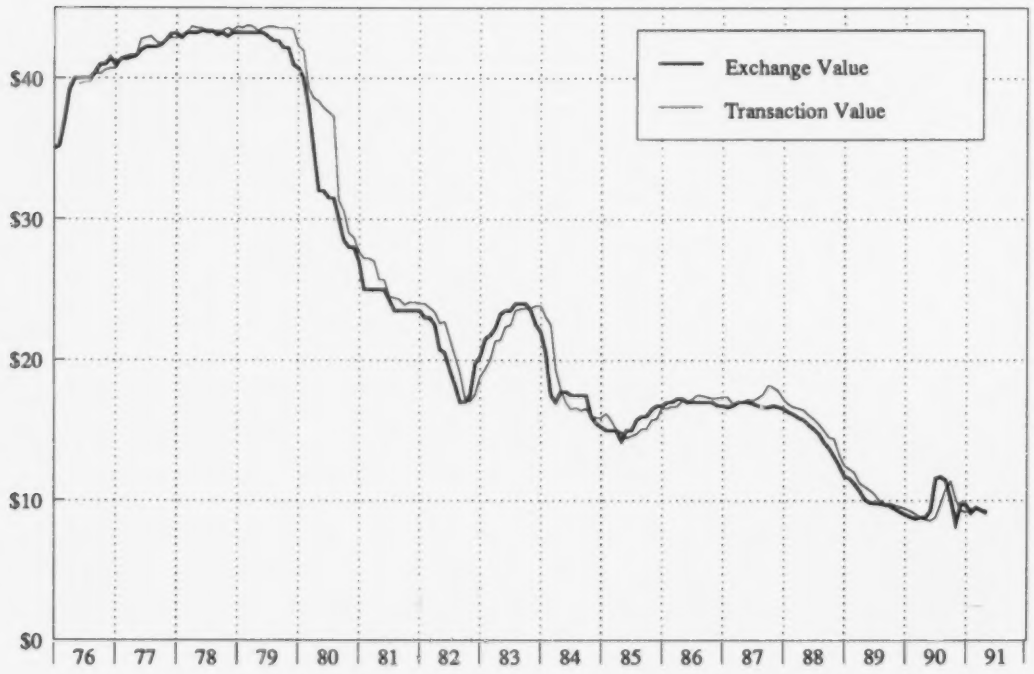
NUEXCO Historical Exchange Value and Transaction Value
(in US dollars per Pound U_3O_8)



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HISTORICAL MARKET DATA

HISTORICAL MARKET VALUES

Exchange Values

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	15.75	15.40	15.10	14.75	14.15	13.75	13.15	12.50	11.75
1989	11.60	11.20	10.70	10.10	9.85	9.80	9.80	9.70	9.60	9.40	9.20	9.00
1990	8.85	8.70	8.80	8.80	9.25	11.60	11.70	11.45	10.10	8.35	9.80	9.70
1991	9.10	9.50	9.30	**9.10**								

US Premium (Relative to the Exchange Value)

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	0.25	0.60	0.00	0.00	0.00	0.00	0.00	**Discontinued**	

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UF_6 Values

Year	Determined as of the last day of the month indicated ($US/kg U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	45.25	44.75	44.00	42.75	41.00	40.75	39.00	37.50	35.50
1989	34.75	34.00	33.00	30.50	30.25	30.25	30.00	29.75	29.75	28.25	27.75	26.50
1990	25.90	25.25	24.40	24.40	25.50	32.00	32.50	32.25	29.50	24.75	28.75	28.75
1991	27.50	27.75	27.50	**27.25**								

US Premium (Relative to the UF_6 Value)

Year	Determined as of the last day of the month indicated ($US/kg U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	0.50	1.00	0.00	0.00	0.00	0.00	0.00	**Discontinued**	

Conversion Values

Year	Determined as of the last day of the month indicated ($US/lb U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	1.80	1.80	1.80	1.85	1.95	1.95	1.95	1.95	1.95
1989	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.80	1.75	1.65
1990	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
1991	1.45	1.45	1.45	**1.45**								

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HISTORICAL MARKET DATA

Transaction Values

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.15	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	16.45	16.10	15.80	15.45	15.00	14.50	14.40	13.30	12.50
1989	12.25	12.00	11.25	11.00	10.75	10.45	9.95	9.80	9.80	9.65	9.55	9.40
1990	9.25	9.05	8.75	8.65	8.55	8.80	9.75	10.80	11.40	10.10	9.30	9.15
1991	9.40	9.45	9.35	**9.30**								

SWU Values

Year	Determined as of the last day of the month indicated ($US per SWU)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	80	80	80	80	75	78	78	78	78	78	80	80
1987	80	80	77	77	75	73	75	75	73	69	73	73
1988	73	73	70	68	68	68	68	65	65	65	65	65
1989	65	67	67	67	66	66	66	65	63	59	57	54
1990	54	50	50	50	50	50	50	50	50	51	51	51
1991	51	50	52	**52**								

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Loan Rates

Year	Determined as of the last day of the month indicated (Percent per Annum)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	4.00	4.00	4.00	4.00	4.00
1969	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00
1970	6.00	6.20	6.40	6.50	6.50	6.50	6.50	5.00	6.50	6.00	5.50	5.50
1971	5.00	4.75	4.75	4.75	5.00	5.25	5.25	5.25	5.25	5.25	4.50	4.50
1972	4.00	4.00	4.00	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00
1973	5.50	5.50	5.75	5.75	6.00	6.25	7.00	7.00	7.00	7.00	7.50	8.00
1974	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1975	8.00	7.00	7.00	7.00	7.00	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1976	6.50	6.50	6.50	6.50	*	*	*	*	*	*	*	*
1977	*	*	*	*	6.50	6.50	6.50	6.75	7.25	7.25	7.25	7.25
1978	7.25	7.00	7.00	7.00	7.00	7.50	7.75	7.75	7.75	7.00	7.00	7.00
1979	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1980	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1981	7.00	7.00	7.00	7.00	7.00	5.50	5.50	5.50	5.50	6.00	6.00	6.00
1982	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1983	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1984	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1985	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1986	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
1987	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	3.50	3.50
1988	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1989	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1990	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1991	3.50	3.50	3.50	**3.50**								

* Float with Prime Rate

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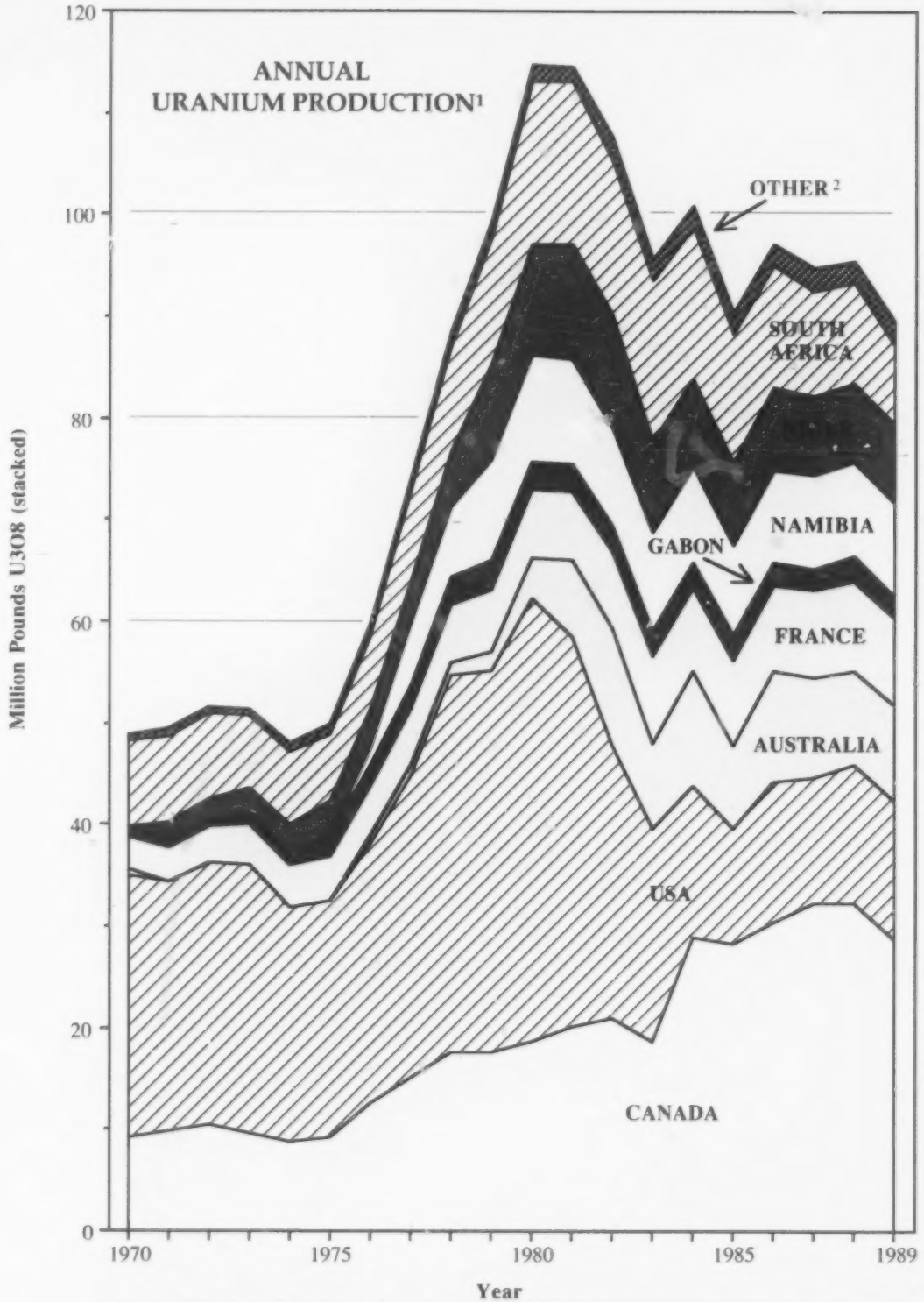
HISTORICAL MARKET DATA



[1] Estimated world production in 1989 totalled 89.6 million pounds (Australia—9.5; Canada—28.7; France—8.5; Gabon—2.2; Namibia—9.2; Niger—7.7; South Africa—7.7; USA—13.7; Others[2]—2.3).

[2] **Other** includes: Argentina, Belgium, Brazil, India, Pakistan, Portugal, Spain, (West) Germany, and Yugoslavia

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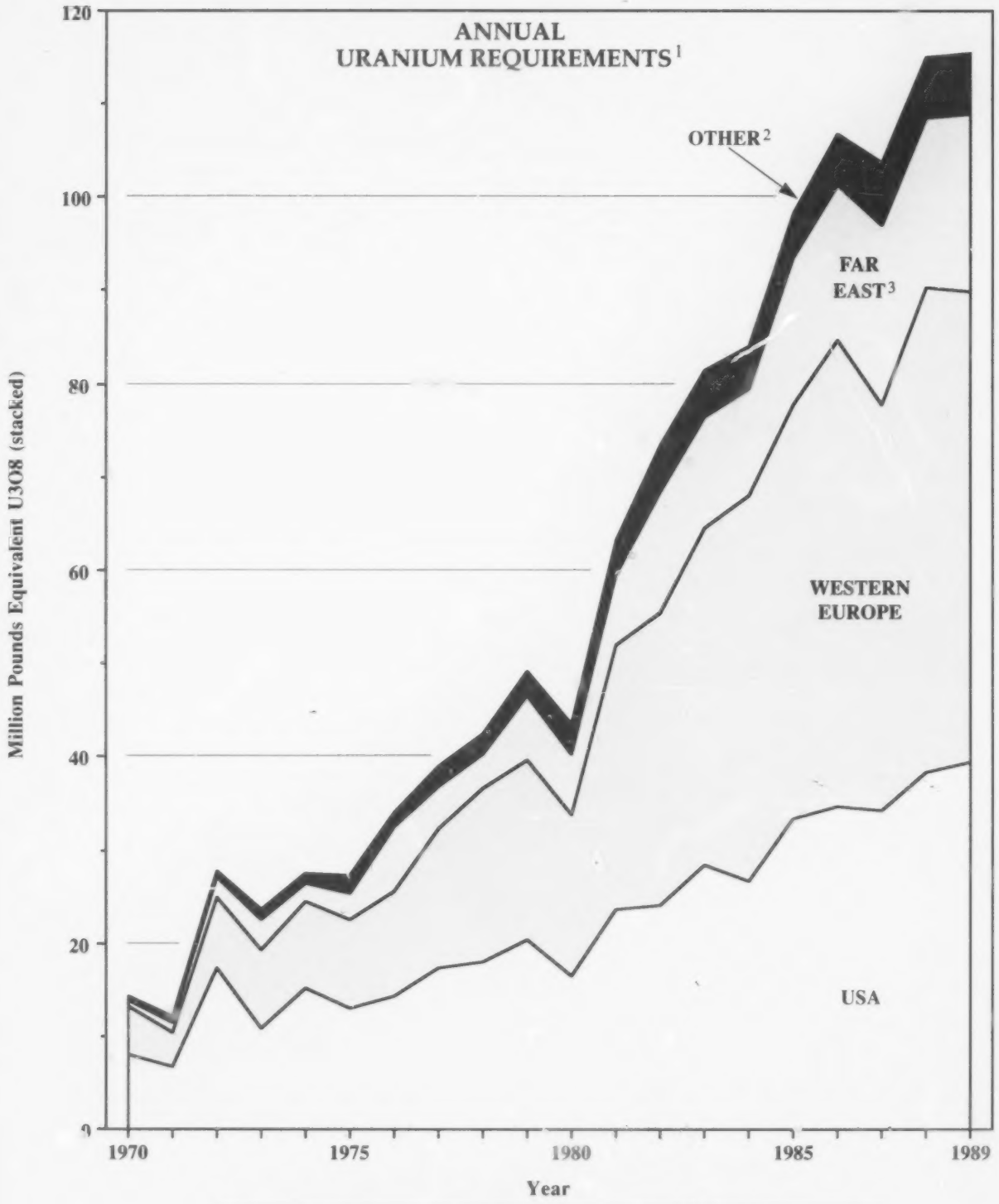

[1] Calculated by NUEXCO based on actual completion dates and operating performance, and NUEXCO's estimate of enriching tails assays.

[2] **Other** include: Argentina, Brazil, Canada, India, Mexico, Pakistan and South Africa.

[3] Does not include Peoples Republic of China.

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GOVERNMENT STATISTICS

Australia

Year	Period[1]	Consumer Price Index[2] (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups[3] (1984/1985 = 100)	Average Weekly Ordinary Time Earnings — Adult Males — Australia[4] (Australian dollars)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates[5] (June 1985=100)
1980	Avg.	95.8	83.1	—	140.8[6]
1981	Avg.	105.0	85.9	—	154.1[6]
1982	Avg.	116.7	89.0	—	174.9[6]
1983	Avg.	128.5	96.9	—	181.9[6]
1984	Avg.	133.6	98.0	—	194.4[6]
1985	Avg.	142.6	107.3	—	103.7
1986	Avg.	155.5	101.5	—	106.1
1987	Avg.	168.7	108.9	465.88	112.3
1988	Avg.	180.9	111.8	496.90	115.2
1989	Avg.	194.6	117.0	534.65	126.0
1990	Avg.	208.7	123.4	571.43	129.3
Jan	1990	—	119.2	—	128.3
Feb	1990	—	120.8	555.80	128.3
Mar	1990	204.1	121.5	—	128.5
Apr	1990	—	119.9	—	128.7
May	1990	—	118.9	566.60	128.9
June	1990	207.4	116.6	—	129.5
July	1990	—	116.4	—	129.6
Aug	1990	—	122.4	574.10	129.7
Sept	1990	208.9	128.2	—	130.1
Oct	1990	—	134.1	—	130.2 R
Nov	1990	214.5	133.7	589.20	130.1
Dec	1990	—	128.8	—	130.2
Jan	1991	—	125.6	—	130.1
Feb	1991	—	—	—	130.1

P = Preliminary R = Revised since last month

[1] Monthly data for the period 1967 to 1986 appears in Report 233 (January 1988).
[2] Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 = 100.0). Figures shown at end of quarter represent quarterly average.
[3] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).
[4] Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.
[5] Australian Bureau of Statistics, Canberra: "Average Weekly Earnings, States & Australia" (Catalogue No. 6302.0).
[6] Base: June 1976 = 100.

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Canada

		Industrial Products Price Index: All Commodities [1] (1986 = 100) [2]	Consumer Price Index: All Items (1986 = 100) [3]	Wage-earner Data: Average Hourly Earnings (C$) [4]				
				Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)
1980	Avg.	75.7	67.1	–·–	–·–	–·–	–·–	–·–
1981	Avg.	83.4	75.5	–·–	–·–	–·–	–·–	–·–
1982	Avg.	89.0	83.7	–·–	–·–	–·–	–·–	–·–
1983	Avg.	92.1	88.5	17.22	–·–	14.18	10.67	11.10
1984	Avg.	96.3	92.3	17.89	–·–	14.97	11.11	11.68
1985	Avg.	99.0	96.0	18.53	16.48	15.56	11.85	12.12
1986	Avg.	100.0	100.0	19.38	16.70	15.76	12.28	12.58
1987	Avg.	102.4	104.4	20.12	17.15	16.11	12.58	13.20
1988	Avg.	106.9	108.6	20.91	18.51	16.95	13.17	13.77
1989	Avg.	109.4	114.0	21.97	20.02	18.41	13.71	14.16
1990	Avg.	109.8R	119.4	22.90	20.93	19.12	14.62	15.28
Jan	1990	108.7	116.9	21.88	20.39	19.03	13.99	14.78
Feb	1990	109.5	117.6	22.51	20.63	19.14	14.49	15.03
Mar	1990	109.3	118.0	22.52	20.75	19.17	14.99	15.07
Apr	1990	109.1	118.1	23.17	21.20	19.46	14.83	14.93
May	1990	109.6	118.7	23.28	20.55	19.01	14.71	15.06
June	1990	109.4	119.2	21.85	20.63	18.96	14.69	15.05
July	1990	109.1	119.8	20.92	20.18	18.66	14.34	15.20
Aug	1990	109.3	119.8	23.88	20.51	18.59	14.50	15.33
Sept	1990	110.2	120.2	24.41	21.19	18.94	14.48	15.63
Oct	1990	110.6R	121.2	23.11	21.39	19.12	14.78	15.59
Nov	1990	110.9R	121.9	23.38	21.83	19.48	14.93	15.73
Dec	1990	110.9R	121.8	23.90	21.89	19.88	14.7	16.01
Jan	1991	111.1	125.0	23.79R	21.79R	19.78R	14.66	15.89R
Feb	1991	110.7R	125.0	25.23P	22.30P	20.02P	14.67P	16.05P
Mar	1991	110.3	125.5	–·–	–·–	–·–	–·–	–·–

P = Preliminary R = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1986 is found in Report 233.

[2] New Base Year of 1986 as of Report 266. Previous Base Year was 1981. All figures in column recalculated by 0.791 multiplier.

[3] New Base Year of 1986 as of Report 264. Previous Base Year was 1981. All figures in column recalculated by 0.755 multiplier.

[4] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1986 is found in Report 233.

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GOVERNMENT STATISTICS

South Africa

		Average Declared Working Costs per Metric Ton of Gold Ore Milled [1] (Rand)	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled [2] (March 1982 = 100)	Consumer Price Index [3] (1985 = 100)	Production Price Index All Groups [4] (1985 = 100)	Total Employment in Mining and Quarrying [5]	Total Salaries and Wages in Mining and Quarrying [5] (1,000 Rand)
							Annual Total [6]
1980	Avg.	35.53	—	51.9	55.2	709,042	2,237,689
1981	Avg.	41.89	—	59.8	62.7	722,918	2,756,928
1982	Avg.	47.25	104.2	68.6	71.4	702,041	3,181,584
1983	Avg.	51.88	115.0	77.1	79.0	700,901	3,563,282
1984	Avg.	58.95	130.3	86.0	85.6	711,511	4,134,390
1985	Avg.	68.76	151.6	100.0	100.0	724,587	4,778,612
1986	Avg.	80.22	177.9	118.6	119.5	756,637	5,767,950
1987	Avg.	95.01	223.1	137.7	136.2	751,864	6,911,395
1988	Avg.	106.69	241.1	155.4	154.1	705,355	7,774,054
1989	Avg.	116.65	273.0	178.2	177.5	700,360	8,833,934
1990	Avg.	129.37	305.3	203.8	199.4	677,742	10,193,209
							Monthly Total
Jan	1990	—	—	192.0	188.8	688,837	801,616
Feb	1990	—	—	193.3	190.3	674,026	767,274
Mar	1990	126.74	296.3	196.4	190.9	704,660	780,614
Apr	1990	—	—	198.3	194.1	696,107	810,474
May	1990	—	—	200.4	196.3	613,527	719,191
June	1990	128.25	299.87	201.8	197.0	676,621	841,165
July	1990	—	—	203.2	197.2	697,242	913,177
Aug	1990	—	—	206.5	199.8	686,385	902,392
Sept	1990	129.46	312.55	209.7	203.2	689,317	922,454
Oct	1990	—	—	211.1	206.1	676,833	882,603
Nov	1990	—	—	215.6	214.9	669,198	909,418
Dec	1990	133.02	312.37	217.1	214.7	660,151	942,831
Jan	1991	—	—	219.5	218.0	—	—
Feb	1991	—	—	222.2	219.3	—	—
Mar	1991	—	—	224.1	—	—	—

P = Preliminary **R** = Revised since last month

[1] Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in Report 236.

[2] Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3] Central Statistical Service, Pretoria: All income groups-weighted average, Historical Data by month appears in Report 236.

[4] Central Statistical Service, Pretoria: All commodities for consumption in South Africa.

[5] Central Statistical Service, Pretoria: Historical Data by month appears in Report 236.

[6] Annual total is shown, rather than monthly average, for indicated year.

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United States

		Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)	(1982-1984 = 100)	(1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	88.0	89.8	82.4	85.7	10.26	10.63	8.30	6.94
1981	Avg.	97.4	98.0	90.9	94.0	11.55	11.98	9.12	7.62
1982	Avg.	100.0	100.0	96.5	100.0	12.31	12.93	9.96	8.21
1983	Avg.	101.1	101.3	99.6	103.9	12.58	13.43	10.58	8.67
1984	Avg.	103.3	103.7	103.9	107.7	13.05	13.43	11.07	9.04
1985	Avg.	103.7	103.2	107.6	110.9	13.38	13.74	11.56	9.46
1986	Avg.	100.0	100.2	109.6	113.9	12.46	13.48	11.98	9.65
1987	Avg.	102.6	102.8	113.6	117.7	12.52	12.98	12.37	9.88
1988	Avg.	106.3	106.9	118.3	121.3	13.24	13.26	12.71	9.79
1989	Avg.	111.6	112.2	124.0	126.3	13.59	13.72	13.09	10.05
1990	Avg.	115.8	116.3	130.7	131.5	14.10	14.36	13.54	10.37
Jan	1990	114.1	114.9	127.4	—	13.69	13.95	13.34	10.13
Feb	1990	113.6	114.4	128.0	—	13.70	13.99	13.27	10.16
Mar	1990	113.2	114.2	128.7	129.5R	13.80	14.04	13.34	10.17
Apr	1990	113.2	114.1	128.9	—	13.92	14.30	13.53	10.17
May	1990	113.5	114.6	129.2	—	13.96	14.16	13.46	10.22
June	1990	113.2	114.3	129.9	131.0	14.00	14.31	13.51	10.27
July	1990	113.4	114.5	130.4	—	14.29	14.49	13.58	10.34
Aug	1990	115.9	116.5	131.6	—	14.27	14.60	13.57	10.33
Sept	1990	118.4	118.4	132.7	132.2	14.41	14.48	13.62	10.42
Oct	1990	121.4	120.8	133.5	—	14.43	14.58	13.72	10.47
Nov	1990	120.7R	120.1	133.8	—	14.34	14.73	13.73	10.53
Dec	1990	118.9	118.6	133.8	133.1	14.39	14.69	13.75	10.57
Jan	1991	118.3	118.9	134.6	—	14.73R	14.63R	13.85R	10.60
Feb	1991	117.2	117.2	134.8	—	14.77P	14.58P	13.82R	10.60R
Mar	1991	115.6	116.1	135.0	134.9	– · –	– · –	13.86P	10.60P

P = Preliminary **R** = Revised since last month

[1] US Bureau of Labor Statistics, Washington, DC: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents. Historical data is presented in Report 233.

[2] US Bureau of Labor Statistics, Washington, DC: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 233.

[3] US Department of Commerce, Washington, DC: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 233.

[4] US Bureau of Labor Statistics, Washington, DC: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 233.

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GOVERNMENT STATISTICS

Volume and Price of Uranium Deliveries To The European Community [1]

— Compiled from data published by the Euratom Supply Agency —

Year	Volume of Deliveries to the EC [2] (MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts [3] Average Price		Spot Contracts [3] Average Price	
			in ECU per pound U_3O_8	in US Dollars per pound U_3O_8	in ECU per pound U_3O_8	in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75
1987	14,000	17.0	ECU 28.25	$32.50	ECU 15.00	$17.25
1988	12,500	4.5	ECU 26.92	$31.82	ECU 13.65	$16.13
1989	13,500	11.5	ECU 26.63	$29.35	ECU 11.04	$12.19

P = Preliminary **R** = Revised since last month

[1] The twelve European Community member nations are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

[2] The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3] For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar. Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

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US Uranium Marketing Activities Statistics

— Compiled from data published by the US Energy Information Administration [1] —

Year	Total Production (million pounds U_3O_8)	Deliveries to Domestic Utilities From US Suppliers [2] (million pounds U_3O_8)	Average Price of Delivered Uranium [2] ($/lb. U_3O_8)	Quantity of Uranium Imported [3] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	27.6	$16.10	3.6	n/a	1.2
1977	29.9	27.8	$19.75	5.6	n/a	4.0
1978	37.0	31.6	$21.60	5.2	n/a	6.8
1979	37.5	33.0	$23.85	3.0	n/a	6.2
1980	43.7	35.0	$28.15	3.6	$43.10	5.8
1981	38.5	32.6	$34.65	6.6	$32.90	4.4
1982	26.9	23.5	$38.37	17.1	$25.19	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6
1987	13.0	20.8	$27.37	15.1	$19.14	1.0
1988	13.1	17.6	$26.15	15.8	$19.03	3.3
1989	13.8	18.4	$19.56	13.1	$16.75	2.1

P = Preliminary **R** = Revised since last month

[1] Sources: 1976-1983: US Department of Energy/Energy Information Administration, *Survey of United States Marketing Activity.*
1984-1989: Energy Information Administration, *Uranium Industry Annual.*

[2] Data for 1976-1981 includes both domestic utilities and agents.

[3] Includes imports by domestic utilities and domestic suppliers.

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